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COMBINED SEWER OVERFLOW STUDY FOR THE HUDSON RIVER CONFERENCE

Alan I. Mytelka, et al

Interstate Sanitation Commission

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The procedure employed included the physical examination of each system's regulators to determine their location, type, dimensions, and condition. A study of available records was made to determine, where possible, trunk line flow, interceptor line design capacity, and characterization of the drainage area served by each regulator which included population and land use. Ten (10) summary tables and forty (40) regulator location figures are included in the report. Dry weather and wet weather sampling was also conducted. By-pass loadings for several pollution perameters have been calculated during storm flow conditions based upon this sampling. Recommendations for minimizing combined sewer overflows are included.

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COMBINED SEWER OVERFLOW STUDY
FOR THE
HUDSON RIVER CONFERENCE

by

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ABSTRACT

A detailed examination was conducted of ten (10) combined sewer overflow systems within that portion of the Hudson River Basin lying within the Interstate Sanitation District. The work included the identification and study of these combined sewer systems in order to determine their location, physical characteristics, and service areas.

The procedure employed included the physical examination of each system's regulators to determine their location, type, dimensions, and condition. A study of available records was made to determine where possible, trunk line flow, interceptor line design capacity, and characterization of the drainage area served by each regulator which included population and land use. Ten (10) summary tables and forty (40) regulator location figures are included in the report. Dry weather and wet weather sampling was also conducted. Bypass loadings for several pollution parameters have been calculated during storm flow conditions based upon this sampling. Recommendations for minimizing combined sewer overflows are included.

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SECTION I

CONCLUSIONS

From the information collected in the course of this study, much insight was gained into the status of the ten sewage collection systems contained in that portion of the Hudson River Basin which lies within the District waters of the Interstate Sanitation Commission. Based upon this study, we have reached the following conclusions:

1) The general condition of the ten sewage systems which were studied indicates that more attention needs to be given to the operation, performance, efficiency, and maintenance of the regulators.

2) Within six of the systems inspected, over 25% of the regulators were inoperable. The severity of conditions which resulted in regulator inoperability ranged from the need for adjustments to the need for complete overhaul.

3) In far too many cases, the personnel assigned to regulator maintenance duty are not properly equipped with either maintenance tools or the necessary safety equipment to properly service the regulators. A noticeable lack of understanding on the part of many of the maintenance personnel as to the purpose and proper operation of regulators was evident during field inspection. Additionally, many of the regulators were intentionally jammed or chained in the open position to maximize wet weather flow to the treatment plant. This can create a three-fold problem of (a) an imbalance of sewage mixture from each regulator drainage basin during wet weather flow; (b) an unreasonably high wet weather flow to the treatment plant which in turn minimizes the effective treatment of this sewage; and (c) a surcharge of the interceptor system with associated local flooding of sewage into streets and basements.

4) With the exception of the Hoboken, New Jersey sewage system, ingress and egress to regulators were through manholes. The small size of the manholes required that personnel had to climb down inadequately sized ladder rungs for access to the regulator chamber. This made maintenance and inspection of equipment difficult and in many cases dangerous. Such conditions are definite deterrents to creating an environment conducive to proper and systematic maintenance of regulator equipment.

5) In many cases, adequate data relating to demographic and hydraulic characteristics for each regulator drainage basin

were either not available or were outdated or incomplete.

6) No remote sensing devices are presently installed on any of the regulators or tide gates to indicate whether the regulator or tide gate is operating properly. Thus, only time-consuming inspection techniques can be utilized to determine when and where a regulator gate, orifice, or tide gate is jammed or clogged and creating a condition of prolonged dry weather bypassing or salt water intrusion into the system.

7) It is strongly felt that in comparison to the attention given to treatment plant efficiencies, too little attention is given to the operation, performance, maintenance, and efficiency of regulators which are a vital part of the sewage system. In fact, the sewage network should be treated as an integral part of the total system of collection and treatment.

8) Field inspections of tide gates and regulators revealed instances where control equipment, i.e., hand cranks and chains, were so severely corroded that they could impair the proper functioning of the equipment. In these cases, tide gates or regulators could jam during dry weather flow such that effluent would bypass the treatment plant.

9) Wet weather sampling conducted at Regulator B-1, located in the Newtown Creek Treatment Plant drainage basin, exhibited a very pronounced first flush phenomena. The quantities of pollutants such as solids, BOD, and oil and grease which are bypassed during a storm are extremely high; for example, during the storm of June 16, 1972, which spanned a 4-hour period and had a peak intensity of 0.65 inches in 1 hour, over 1,000,000 pounds of total suspended solids, 36,000 pounds of BOD, and 180,000 pounds (24,000 gallons) of oil and grease were bypassed. During this period of bypassing (about 4 hours), approximately 30 times as much suspended solids were bypassed as are discharged from the treatment plant in a full 24-hour normal dry weather flow period. The respective maximum concentrations (Mg/L) for TSS. BOD. and oil and grease were 20,000, 465, and 4,300 during this storm. These values, together with those found for heavy metals, confirm that a high priority needs to be given to the pretreatment of industrial wastes and source control to minimize their deposition on streets and subsequent contamination of runoff water.

10) In view of the tremendous quantities of pollutants bypassed during the rainfall from this combined sewer system, it does not seem reasonable to debate whether secondary treatment plants should be designed for 80, 85, or 90% BOD or suspended solids removal when in fact the small increments

gained in this range are completely overshadowed by the bypassing occurring at regulators during wet weather flow.

11) The necessary improvement in the quality of receiving waters and the reopening of beaches will not be accomplished by the multi-billion dollar treatment plant upgrading and expansion program now going on within the District, and the monies spent for this construction in large part will be wasted if means of mitigating the effects of combined sewers are not found.

SECTION II

RECOMMENDATIONS

Based upon the results of the study and the conclusions reached, the following are strongly recommended:

1) Greater emphasis needs to be placed on the establishment of significant programs to better maintain and regulate the overall performance and hence efficiency of combined sewer systems. Maintenance programs, inspection procedures, and surveillance networks need to be either established or better formulated to insure that optimal amounts of highly concentrated sewage be intercepted for treatment purposes.

2) Conventional methods of evaluating sewage treatment plant efficiencies by means of percentage removal of pollutants leaving compared to those entering the treatment plants need to be revised. Attention should also be given to evaluating the overall efficiency of a sewage network by considering the bypass discharge from regulators during dry and wet weather flows together with the effluent from treatment plants. The percent removal of pollutants would then be based on the quantity of sewage exiting from the entire system, i.e., treatment plant and regulator bypass as compared to the sewage entering the system.

3) Access to regulator equipment needs improvement. Certainly, in the design and construction of new regulators, the following should be provided: larger entrance openings to chambers, larger work areas within chambers, and space for the installation of lighting equipment within chambers. Emphasis should also be given to using the latest available construction materials which can best withstand the corrosive environment found within regulator chambers.

4) Initiation of training programs for regulator maintenance personnel for the purpose of giving instruction and stressing the importance of proper maintenance and operation of regulators is needed. Sufficient maintenance and safety equipment and supplies should also be provided to all regulator maintenance crews.

5) Increased types of information should be kept on a current basis for each regulator. This should include demographic and hydraulic data as well as information concerning bypass flows.

6) In addition to establishing a scheduled maintenance program for regulators and tide gates by trained field personnel, methods for minimizing the effects from combined

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sewers on receiving waters need to be developed. In this regard, the following are suggested:

(a) Consideration should be given to the installation of a monitoring system to signal to a central location whether a regulator or tide gate is in the open or closed position so that non-essential bypassing can be eliminated.

(b) Consideration should be given to flushing sewers during dry weather periods in order to eliminate solids buildup that may occur. Means of flushing, whether by use of small slugs of potable water or sewage treatment plant effluent recirculated into the system, need to be examined on a case-by-case basis.

(c) Consideration should be given to in-line sewage storage and optimization of regulator settings to enable as much of the first flush as possible to flow to treatment plants before the combined sewage is diverted by the regulators directly to the receiving waters.

(d) Consideration should be given to the construction of two dikes -- one extending from Fort Wadsworth on Staten Island and one from Nortons Point on Coney Island (see Figure 1). The purpose of these dikes would be to divert the flows which come through the Narrows into the Lower Bay away from the beaches for a longer period of time, thus improving the water quality at the beaches during and following wet weather periods.

7) A high priority should be given to the pretreatment of industrial wastes to remove heavy metals and other harmful constituents to the maximum extent possible. This will not only reduce their detrimental effects on treatment plants but also prevent them from being directly discharged into receiving waterways by regulators which bypass during wet weather conditions.

8) Consideration should be given to the control of contaminants and debris in street runoff water. This should include improved street cleaning operations as well as source controls.

9) The type of information developed in this study of ten sewerage systems is needed for the other areas of the Interstate Sanitation District. A similar study should be extended to these areas as soon as possible so that a definitive evaluation of the combined sewer overflow problem during dry and wet weather periods can be made.

SECTION III

ARRANGEMENT OF THE REPORT

This report is arranged in the following manner: Sections I and II are the Conclusions and Recommendations of this study.

Section IV is the Introduction and Literature Review which contains the background information relating to the inception of this study and gives pertinent information obtained from a survey of the literature.

Section V is a General Discussion. It includes information on safety equipment precautions, procedures followed during regulator inspections, and some general comments on these inspections.

Sections VI through XV contain information on the ten drainage systems studied. Each section gives the specific results of the Interstate Sanitation Commission inspections of each regulator within the given drainage area including the operability of the regulator and information pertaining to the drainage area for each regulator. Each of the ten sections is arranged as follows: First there is a brief discussion of the system. This is followed by a table containing information describing each regulator. The data is presented in tabular form in order to condense the information as much as possible. Each table contains the following information (when available):

First page -
- regulator number
- location
- manufacturer
- type
- drainage area
- population data
- land use data
- trunk line mean dry weather flow (MDWF)
- interceptor design capacity

Continuing page -
- regulator number
- line size characteristics, line size and materials of construction of the interceptor (upstream and downstream), trunk, bypass, and outfall lines

- receiving waterway -- of outfall line
- inspection data -- findings of the ISC inspections (the latest information on the condition of the regulators are contained in the Notes on the bottom of the final table sheet)
- figure number -- directs the reader to the figure in which that regulator can be found on a map of the area

Following the table are figures (maps) which give the location for each regulator, the drainage area boundaries, the sizes and locations of interceptor lines, the locations of bypass and outfall lines, the locations of pump stations, and the treatment plant.

Following the sections on inspections and detailed information on each drainage area is Section XVI which details the Commission's sampling and analyses at two regulators within the study area. Additional land use and demographic characteristics of drainage areas relating to these regulators are also presented.

Appendices A, B, C, and D, respectively, are a figure depicting a schematic diagram of a typical regulator, a glossary of terms used in this report, a legend showing symbols used on the "key" and regulator maps, and a listing of terms used in Tables 18 and 20.

Following this section (Section III) is Figure 1 -- a location map showing the ten drainage basins that were studied in this report. This map is followed by Figures 2 through 8 which are "key maps" outlining figure locations within the drainage areas of the ten systems studied. The "key maps" also indicate the surrounding area of each map in a particular drainage basin.

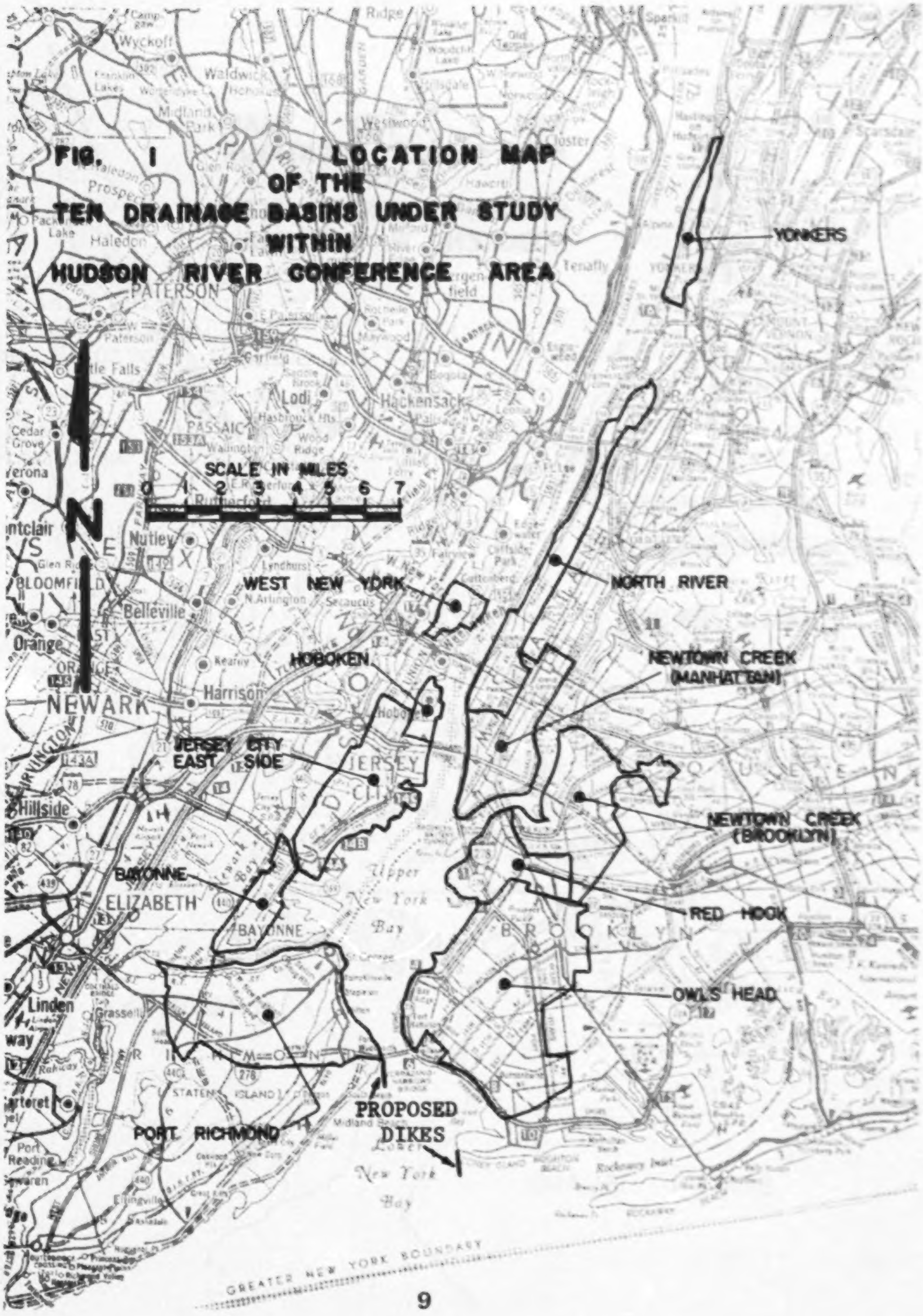

FIG. 1 LOCATION MAP OF THE TEN DRAINAGE BASINS UNDER STUDY WITHIN HUDSON RIVER CONFERENCE AREA

N
SCALE IN MILES
0 1 2 3 4 5 6 7
YONKERS
NORTH RIVER
WEST NEW YORK
HOBOKEN
NEWTOWN CREEK (MANHATTAN)
JERSEY CITY EAST SIDE
NEWTOWN CREEK (BROOKLYN)
BAYONNE
RED HOOK
OWL'S HEAD
PORT RICHMOND
PROPOSED DIKES
Upper New York Bay
Lower New York Bay
GREATER NEW YORK BOUNDARY
PATERSON
Hackensack
NEWARK
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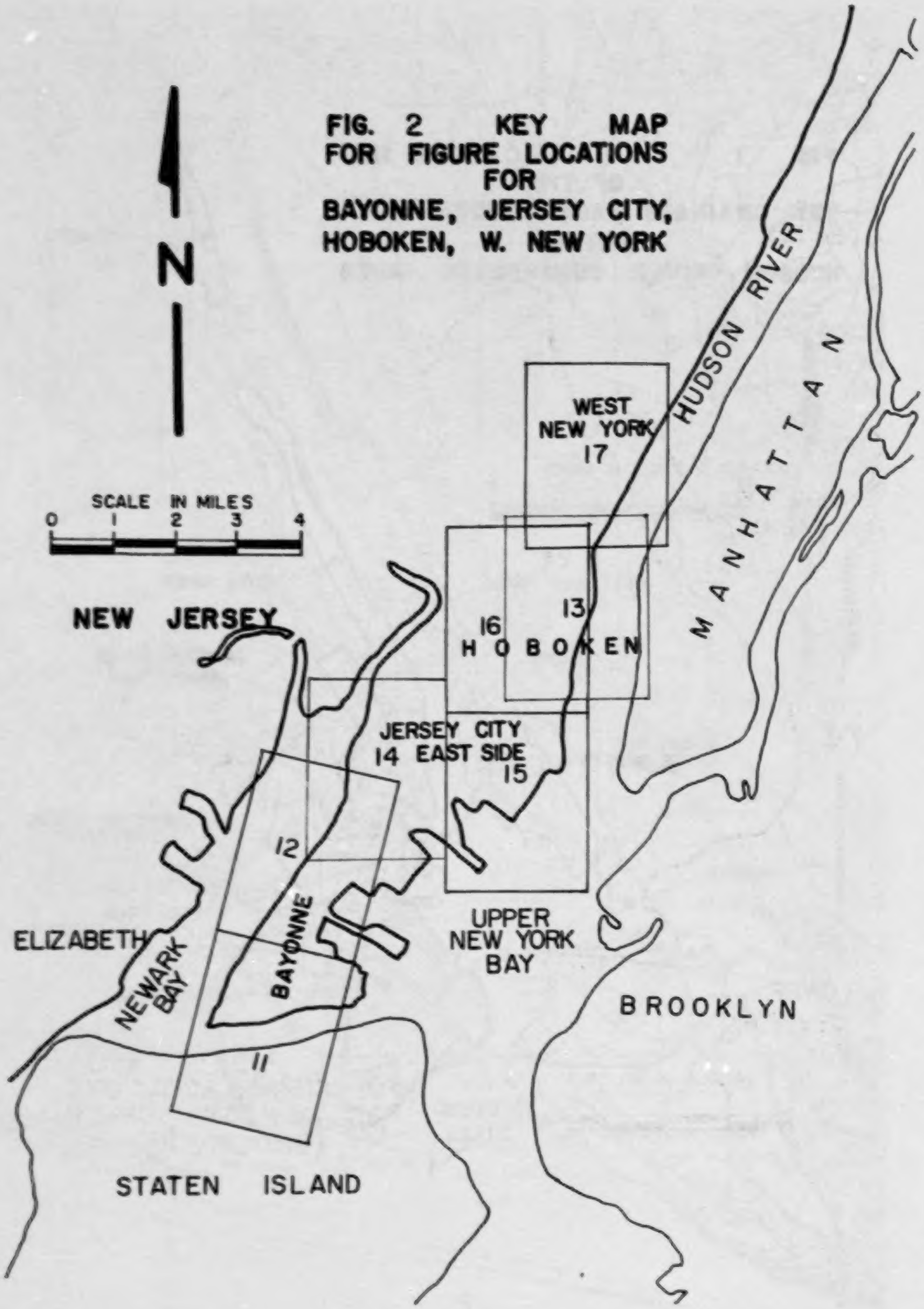


FIG. 2 KEY MAP FOR FIGURE LOCATIONS FOR BAYONNE, JERSEY CITY, HOBOKEN, W. NEW YORK

N
SCALE IN MILES
0
1
2
3
4
NEW JERSEY
HUDSON RIVER
MANHATTAN
WEST NEW YORK
17
16
13
HOBOKEN
JERSEY CITY EAST SIDE
14
15
12
ELIZABETH
NEWARK BAY
BAYONNE
11
UPPER NEW YORK BAY
BROOKLYN
STATEN ISLAND

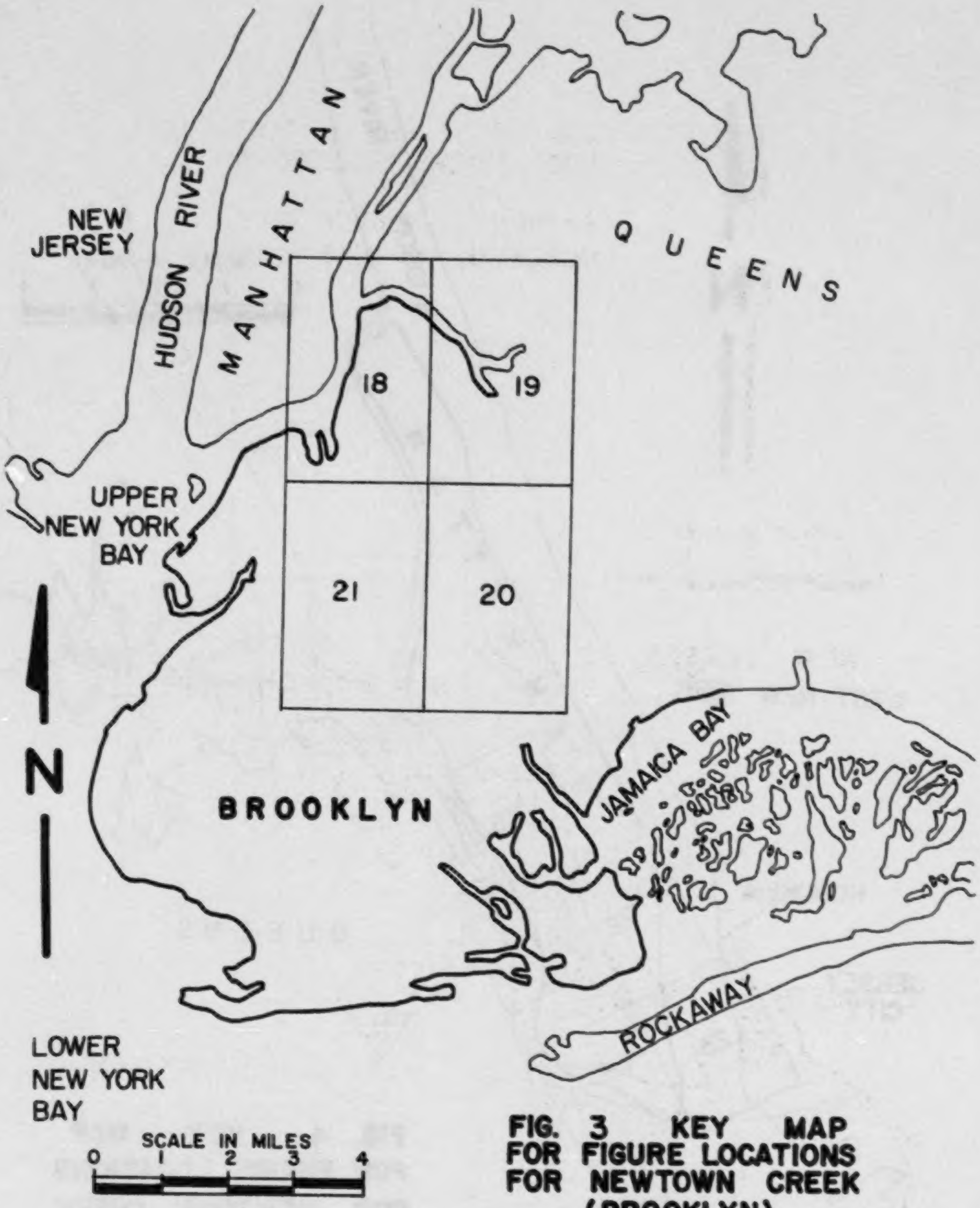

NEW JERSEY
HUDSON RIVER
MANHATTAN
QUEENS
18
19
21
20
UPPER NEW YORK BAY
N
BROOKLYN
JAMAICA BAY
ROCKAWAY
LOWER NEW YORK BAY
SCALE IN MILES
0
1
2
3
4

FIG. 3 KEY MAP FOR FIGURE LOCATIONS FOR NEWTOWN CREEK (BROOKLYN)

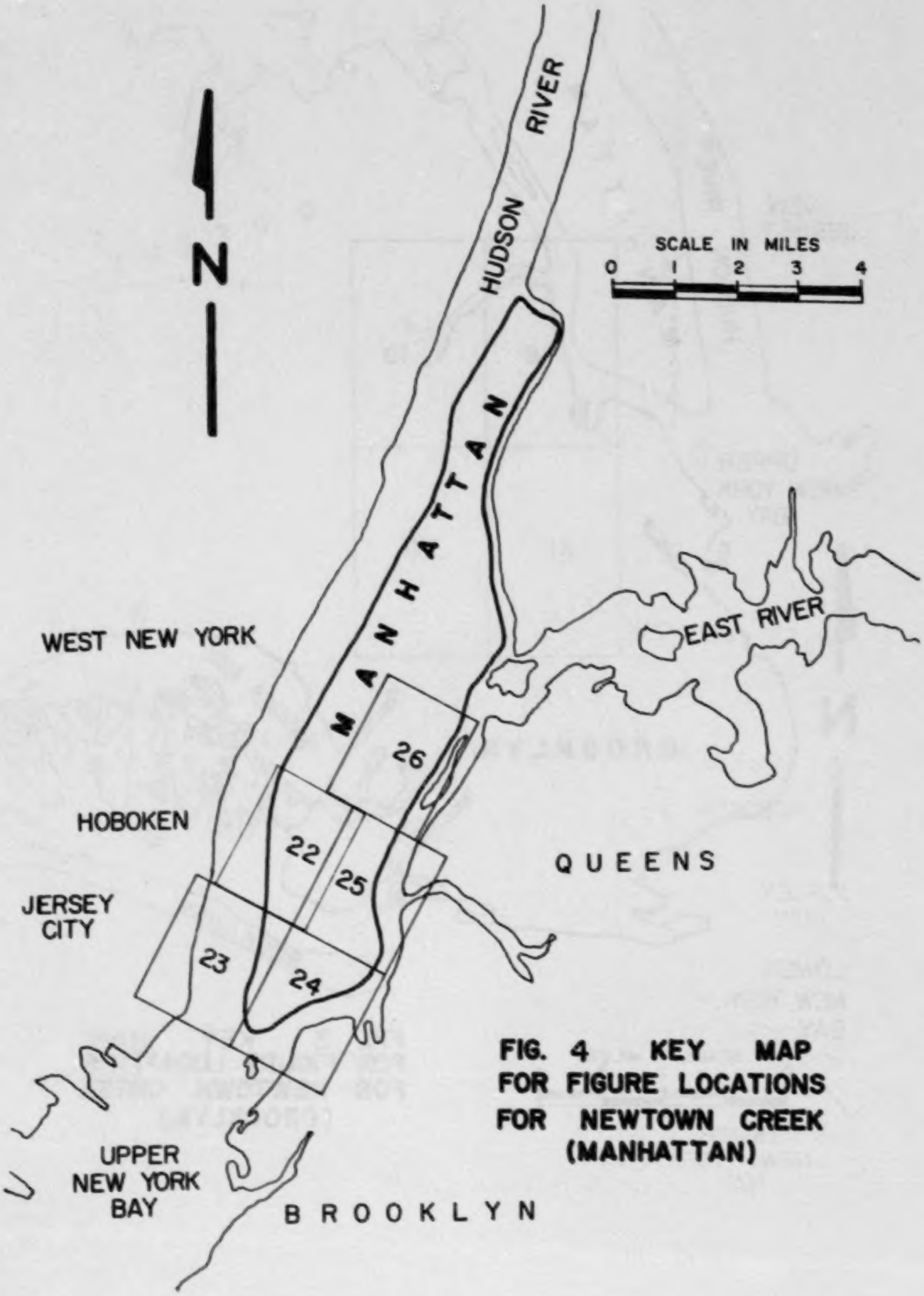

N
HUDSON RIVER
SCALE IN MILES
0 1 2 3 4
MANHATTAN
WEST NEW YORK
EAST RIVER
26
HOBOKEN
22
25
QUEENS
JERSEY CITY
23
24
UPPER NEW YORK BAY
BROOKLYN

FIG. 4 KEY MAP FOR FIGURE LOCATIONS FOR NEWTOWN CREEK (MANHATTAN)

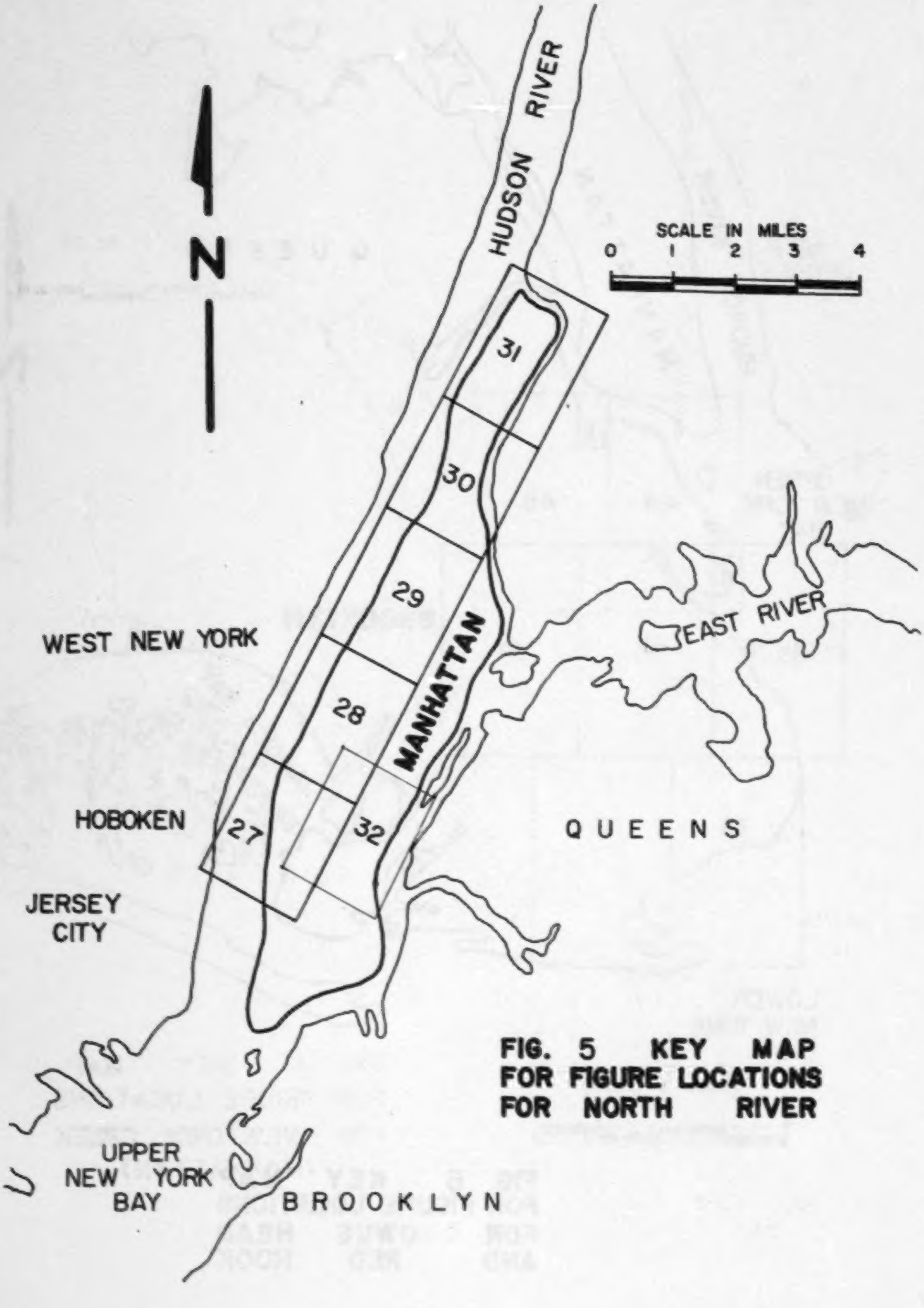
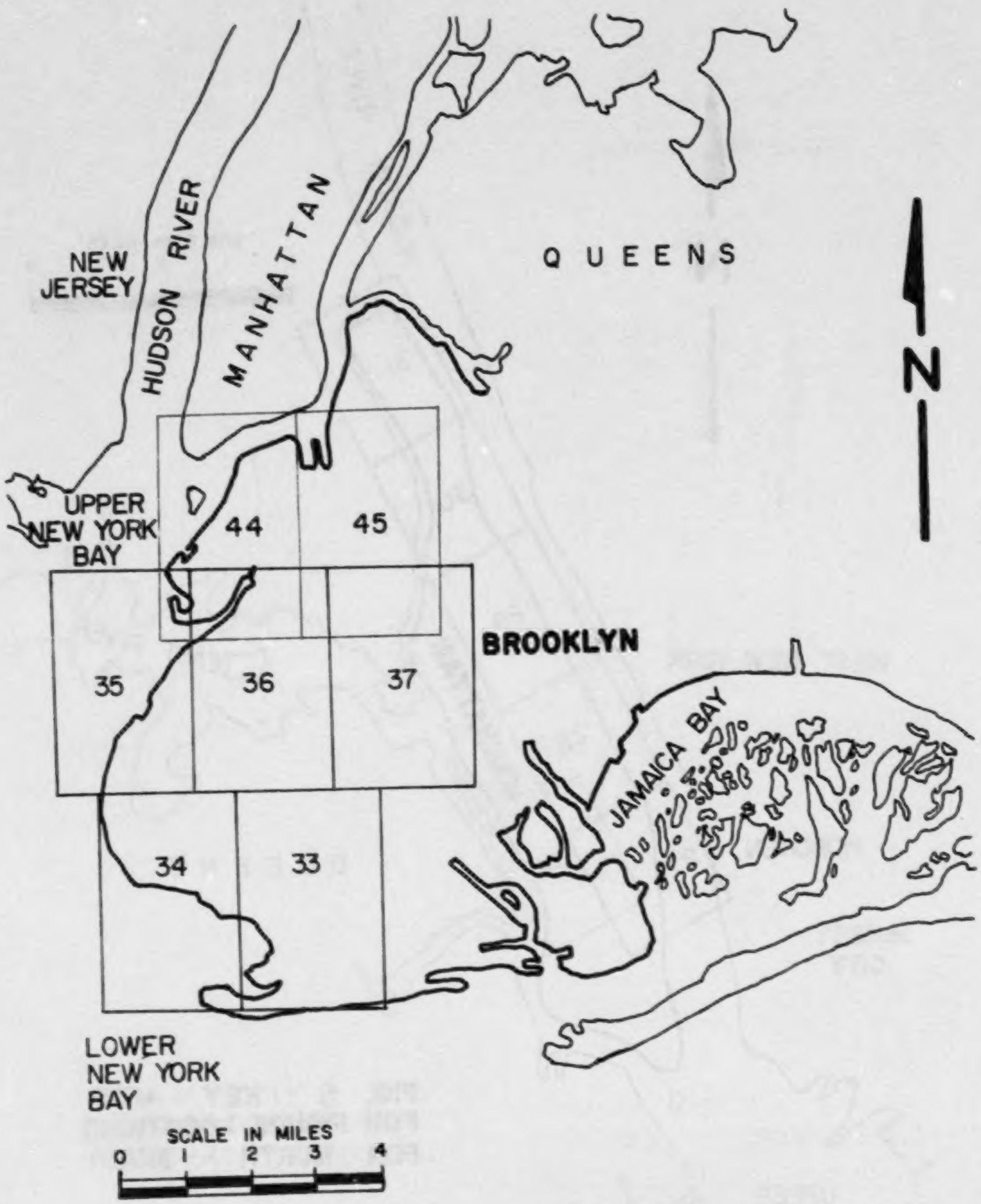

HUDSON RIVER
N
SCALE IN MILES
0 1 2 3 4
31
30
29
28
27
32
MANHATTAN
WEST NEW YORK
EAST RIVER
HOBOKEN
QUEENS
JERSEY CITY
UPPER NEW YORK BAY
BROOKLYN

FIG. 5 KEY MAP FOR FIGURE LOCATIONS FOR NORTH RIVER



NEW JERSEY
HUDSON RIVER
MANHATTAN
QUEENS
N
UPPER NEW YORK BAY
44
45
BROOKLYN
35
36
37
JAMAICA BAY
34
33
LOWER NEW YORK BAY
SCALE IN MILES
0
1
2
3
4

FIG. 6 KEY MAP FOR FIGURE LOCATIONS FOR OWLS HEAD AND RED HOOK

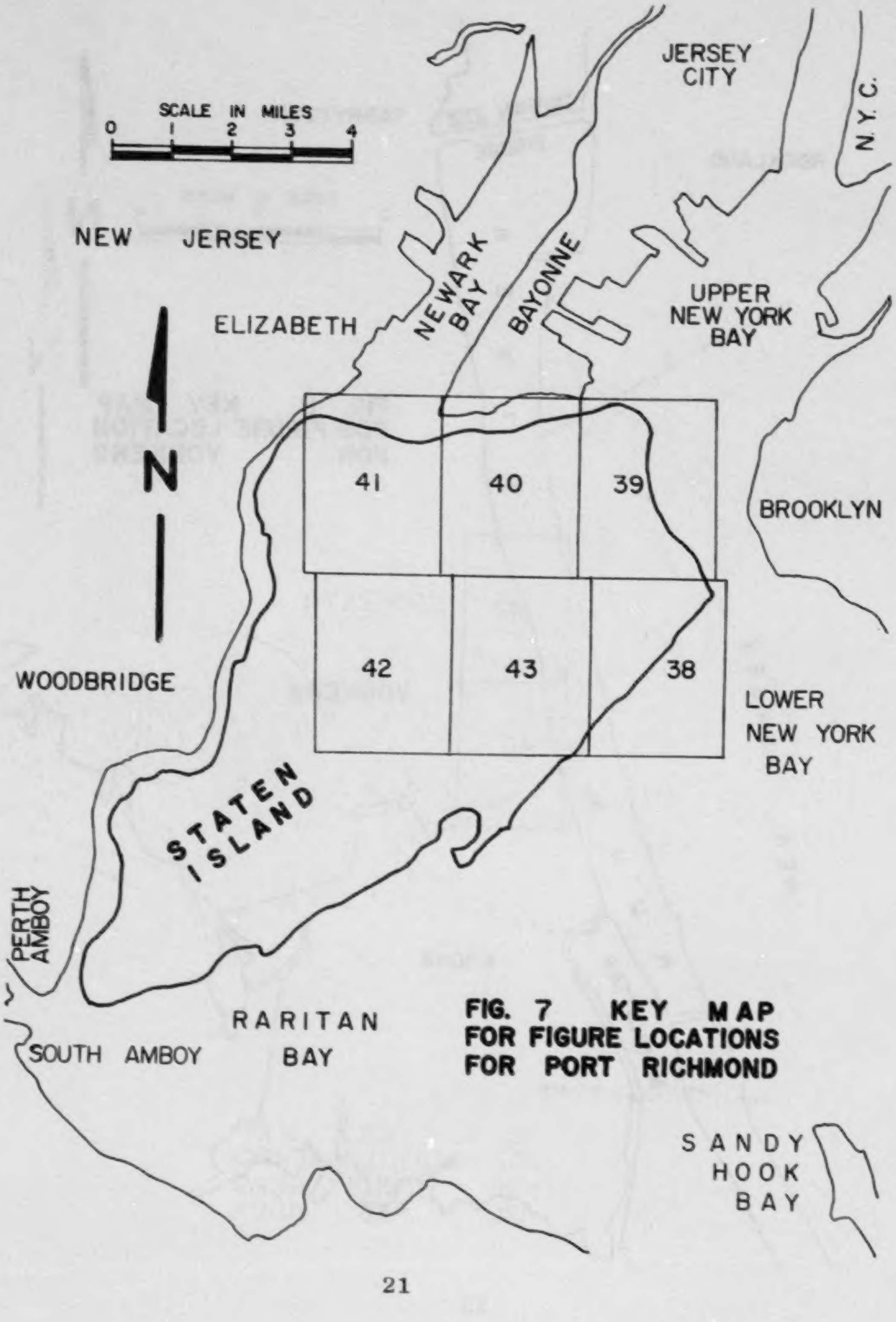

SCALE IN MILES
0
1
2
3
4
NEW JERSEY
N
ELIZABETH
NEWARK BAY
BAYONNE
JERSEY CITY
N.Y.C.
UPPER NEW YORK BAY
41
40
39
42
43
38
BROOKLYN
WOODBRIDGE
LOWER NEW YORK BAY
STATEN ISLAND
PERTH AMBOY
SOUTH AMBOY
RARITAN BAY
SANDY HOOK BAY

FIG. 7 KEY MAP FOR FIGURE LOCATIONS FOR PORT RICHMOND

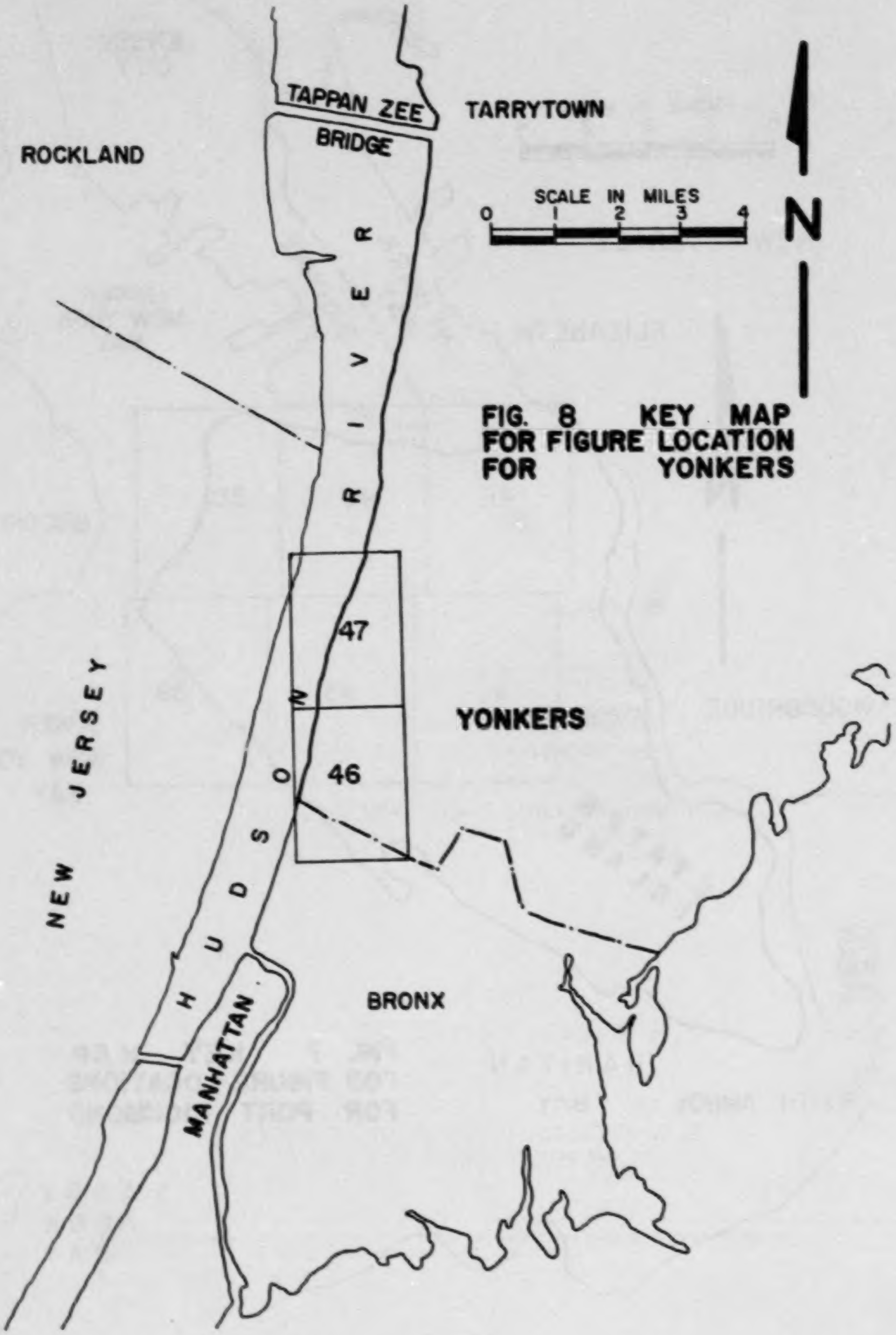

TAPPAN ZEE
BRIDGE
TARRYTOWN
ROCKLAND
SCALE IN MILES
0
1
2
3
4
N
RIVER
HUDSON
NEW JERSEY
47
46
YONKERS
MANHATTAN
BRONX

FIG. 8 KEY MAP FOR FIGURE LOCATION FOR YONKERS

SECTION IV

INTRODUCTION AND LITERATURE REVIEW

A sizable portion of the sewer systems within the Interstate Sanitation District are of the combined type and their effluents represent a major water pollution problem. As such, a comprehensive understanding and evaluation of these systems is a prerequisite to the achievement of water quality standards for the combined sewer receiving waters in the Interstate Sanitation District.

One of the recommendations of the Third Session Conference on the Hudson River (1) was that the Interstate Sanitation Commission undertake an examination of combined sewer overflows as the first stage in the development of a remedial program for this area. The Commission initiated its program which was subsequently augmented by a grant from the United States Environmental Protection Agency. The ten combined sewer systems investigated in this study were:

1. Bayonne, New Jersey
2. Hoboken, New Jersey
3. Jersey City East Side, New Jersey
4. West New York Joint Outlet, New Jersey
5. Newtown Creek, New York
6. Owls Head, New York
7. North River, New York
8. Port Richmond, New York
9. Red Hook, New York
10. Yonkers, New York

The report of this study includes findings, conclusions, and recommendations, together with identification and examination of regulators in these ten combined sewer systems. The procedures employed included inspection and examination of the combined sewer regulators to determine their locations, types, dimensions, and conditions and a study of available records concerning regulator hydraulic capacity as well as land use data and population densities of the drainage areas served by these regulators.

A sampling and analysis program was also conducted at two regulators to establish characteristic flow curves, analyze effluent species, and determine loadings for dry and wet weather flows. Grab samples of regulator flows were obtained at appropriate intervals. Composite samples, when required, were formed by combining these samples. All samples were analyzed by laboratory methods as specified in "Standard Methods of Water and Wastewater Analysis" (2) to determine their respective concentrations. Effluent loadings could then be estimated by utilizing this data together with total runoff data as calculated by the rational formula $Q=CIA$ where:

Q = peak runoff
C = runoff coefficient
I = average rainfall intensity
A = drainage area

Section XVI describes the details involved in applying the rational method to this study.

In coordination with the preparation of this study, a literature search was conducted to ascertain pertinent background information.

A questionnaire study was conducted by the American Public Works Association. Their first report (3) was concerned with the extent of the overflow problem and its effect on the Nation's waterways. Some of the findings in their report were:

(a) A total of 10,025 regulators located at combined sewer overflow stations or other locations were used by the 641 jurisdictions surveyed. The most common regulator type was of the weir construction or static. The least common was the mechanical regulator, i.e., hydraulic cylinder, manual or automatic valves.

(b) The operational performance of all the regulators was rated about equal.

(c) Dry weather overflows were reported by 96% of the jurisdictions. Half of these overflows were the result of improper regulator operation and half by insufficient sewer capacity.

(d) Few of the jurisdictions surveyed monitored the quantity or quality of the combined sewer overflow.

In 1970, the American Public Works Association issued a second report (4). This study was primarily concerned with the design, operation, maintenance, and utilization of combined sewer overflow regulators. Several factors relative to the design and operation of regulators were found to be contributory to the pollution of receiving waters. They are:

(a) Regulator malfunctions which allow overflows during dry weather flow periods.

(b) Regulator malfunctions which allow overflow to continue for periods considerably longer than that required to protect the treatment plant.

(c) Tide gate malfunctions which fail to protect interceptor lines from the inflow or receiving waters.

This report also recommends improved regulator practices to reduce pollution. These include:
(a) Use of regulators which are sensitive to variations in hydraulic flow.

(b) Improved operations and maintenance procedures to increase efficiency and performance of existing regulators.

(c) Integration of individual regulators into a total system so as to have complete management of the regulators, interceptors, pump stations, and treatment plants.

(d) Use of instrumentation and remote control functions for control of interceptor flows upstream of regulators.

Both of the APWA reports recognize that the proper operation of the overflow regulator is a key factor in insuring the efficient operation of treatment plants and other control facilities.

Automated data acquisition and remote control functions of combined sewer systems have been reported in the literature. The City of Cincinnati (5) uses telemetered monitoring to detect regulator malfunctions and excess overflows. A visual display is utilized to locate the region of the overflows. The Minneapolis-St. Paul Sanitary District (6) has demonstrated reductions in combined sewer overlow pollution by utilizing a rather sophisticated regulator control system. The incidence of overflow was reduced by 88%. The project includes a computerized data acquisition and control system that permits remote control of modified regulators. Based upon rainfall and wastewater level measurements, storm flows can be diverted to interceptors for temporary storage.

The Cities of Detroit (7) and Seattle (8) have completed projects similar to a system developed in Minneapolis-St. Paul (6). They incorporate rain and sewer level sensors, computerized data acquisition and remote control operation of regulators and pump stations. The monitoring system provides data on which regulators are slow, overloaded, or blocked as well as permitting first flush interception, selective retention and overflow.

The American Public Works Association has also published a manual of practice for combined sewer regulation and management (9). It provides guidelines for designs, application, instrumentation, operation, and maintenance of static, semiautomatic and automatic regulators. New concepts in regulator design are also presented. These include: fluidic devices, swirl (vortex) regulator/separators, spiral (helical) flow regulator/separators, stilling ponds, high side spill weirs, broadcrested inflatable fabric dams, and overall system remote positive control.

A study (10) of the management and control of combined sewer overlows presents various techniques and systems to control these overflows. These methods include physical-chemical treatment of overflows (11,12), underwater storage (13), or storm standby tanks (14). Other advance control systems include high-rate dual media filtration (15, 16), microstraining (17), and screening/dissolved air flotation (18).

Additional studies (19,20, 21) have been performed relating urban storm runoff and the stormwater infiltration problem. It should be noted that in these studies as well as those mentioned previously, extrapolation of data is quite difficult due to differences in land use, population, and sewer system sizes.

Preliminary pollution model studies of the New York Harbor Area performed by the U.S. Corps of Engineers (22) have shown that two dikes - one extending from Fort Wadsworth on Staten Island and the other from Nortons Point on Coney Island (See Figure I) would tend to divert combined sewer overflow from the surrounding beaches as well as increasing the time before the overflow reached the beaches during and following wet weather periods. These studies have shown that additional effort is warranted to optimize the location, size and orientation of these dikes.

SECTION V

GENERAL DISCUSSION

The importance of safety cannot be overemphasized during field operations. Safety procedures and equipment must be specified in any inspection work involving entrance to regulator structures.

Safety Equipment:

The safety equipment utilized in the inspection and sampling of regulators in the Hudson River Conference study area is illustrated in Figure 9-A. The following is a list of the equipment used to permit safe inspection by crews within a regulator facility.

1. Oxygen Deficiency and Explosion Meter
2. Steel Tip Work Shoes and Rubber Boots
3. Explosion Proof Lights
4. Hard Hat
5. Rain Wear (rain garments and hip boots)
6. Rubber Gloves
7. Safety Harness and Lines
8. Manhole Cover Hooks
9. Road Safety Cones
10. Barricades
11. Flashing Hazard Warning Lights

It is strongly recommended that maintenance personnel for the purpose of inspection familiarize themselves with the proper use, limitations, and maintenance of this equipment prior to utilizing them in any inspection activities.

Regulator Inspection Procedure:

A typical inspection involves three major phases after verifying the regulator location with the use of map coordinates. These three phases are as follows:

Phase 1 - Regulator Site Safety Inspection
Phase 2 - Inspection of Regulator Equipment
Phase 3 - Reports and/or Correction of Malfunctions

Phase 1 involves the positioning of road safety cones and hazard lights. A traffic controller should be used when manholes are located on roads. The oxygen deficiency and explosion meter is utilized to determine the air quality within the chamber. Usually the probe is inserted into the vent port on the manhole to take this measurement. If conditions are within prescribed safety requirements, the manhole

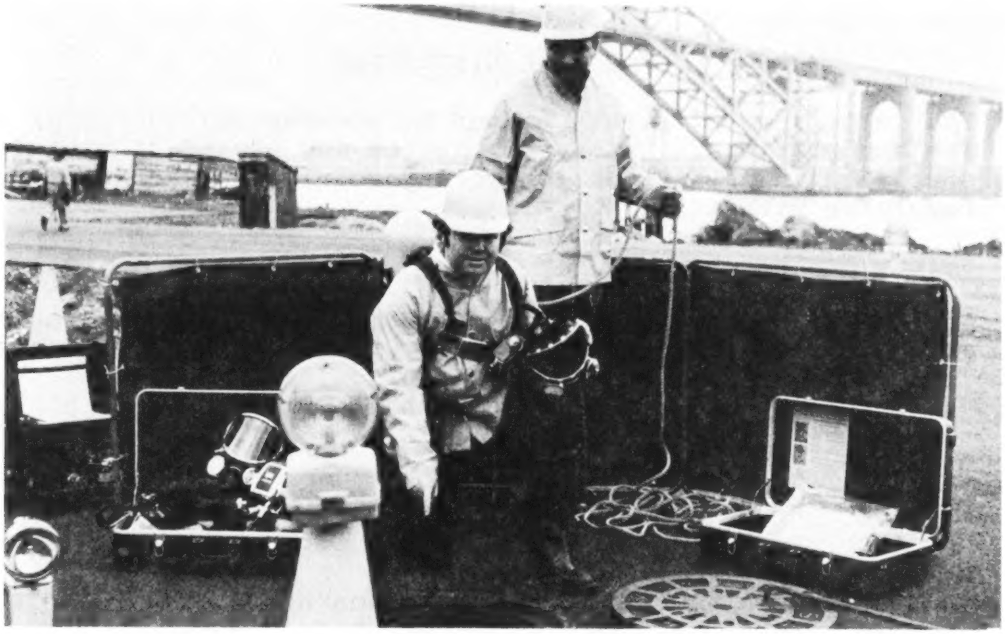


FIG. 9-A, STANDARD PREPARATION AND SET-UP FOR REGULATOR INSPECTION

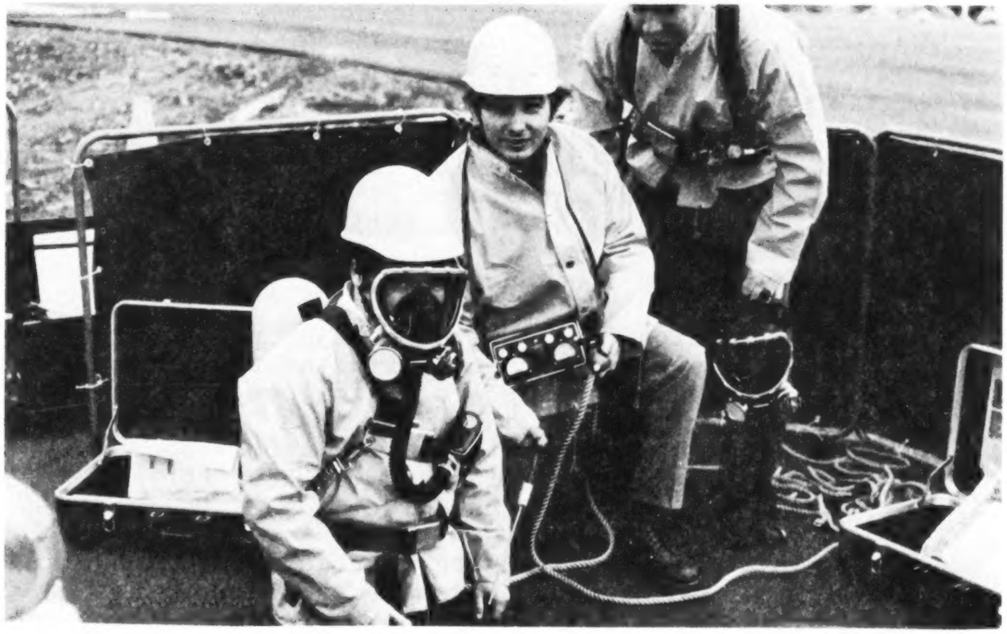


FIG. 9-B, FIELD PERSONNEL ENTERING MANHOLE FOR REGULATOR INSPECTION cover is removed to allow for additional venting and to permit entry of the crew. Prior to entry into the regulator chamber, the inspector should don the proper safety equipment. A minimum of two men should remain on the surface, one fully outfitted with a duplicate set of equipment in the event of an emergency.

Phase 2 consists of inspecting the regulator equipment, verifying the proper operation of the regulator and associated components, and checking the tide gate for proper seal. Visual inspections are also made of the chamber and of its condition, i.e., quantities of debris, oil, grit, and grease.

Phase 3 consists of recording all pertinent observations regarding nominal performance of the regulator and of any improper conditions. Sufficient information should be reported to permit repair crews to correct failures or clean regulators without additional utilization of the inspection crew.

General Inspection Observations:

The performance of maintenance operations on regulator systems was the most predominant problem reported by inspection crews. Access to regulator chambers was generally difficult due to a combination of bulky safety equipment (i.e., Scott Air Packs) and small manhole entry points. Ladder rungs proved to be too narrow and most times provided inadequate footing for inspection crews. Lighting within the regulator chambers was poor and made visual observations difficult. Since most of the regulators were located beneath heavily travelled streets, inspections had to be scheduled to minimize traffic interference.

Bypass lines had small manholes which made access difficult. As a result, tide gates were usually poorly maintained and accumulation of wood and other debris was common. (A coarse bar screen at the exit of the outfall would probably limit the entrance of this material into the bypass line.) Chains used to lift tide gates were missing or usually severely damaged due to corrosion and, as a result, proper seating of the tide gate was difficult to check. High tides occurring during daylight working hours severely limited the inspection crew from maintaining the tide gates.

Float wells usually had large accumulations of grit and grease. These deposits could not be cleaned easily because of the lack of high pressure water lines to wash down the chamber.

Regulators which were inspected and maintained on a routine basis by full-time regulator inspection crews provided more efficient flow control to the sewage treatment plant.

A regulator typical of those found in this survey is shown in Figure 10-A. Figure 10-B is somewhat typical of the outfalls observed in this study.

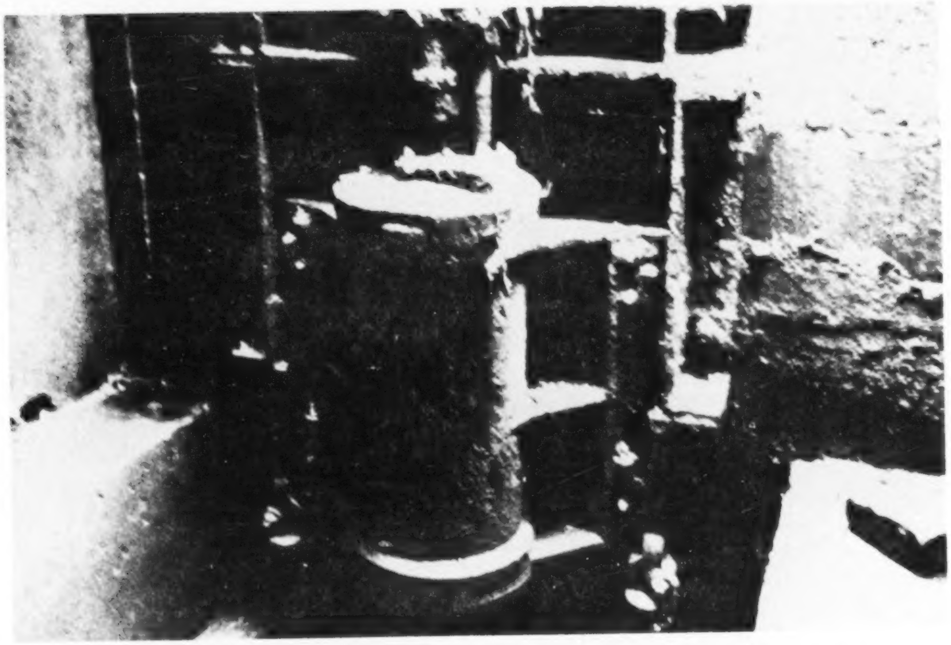


FIG. 10-A, HYDRAULICALLY OPERATED SLUICE GATE AT REGULATOR 6 (CONTRACT 2), NICHOLAS AVENUE AND RICHMOND TERRACE, PORT RICHMOND, NEW YORK

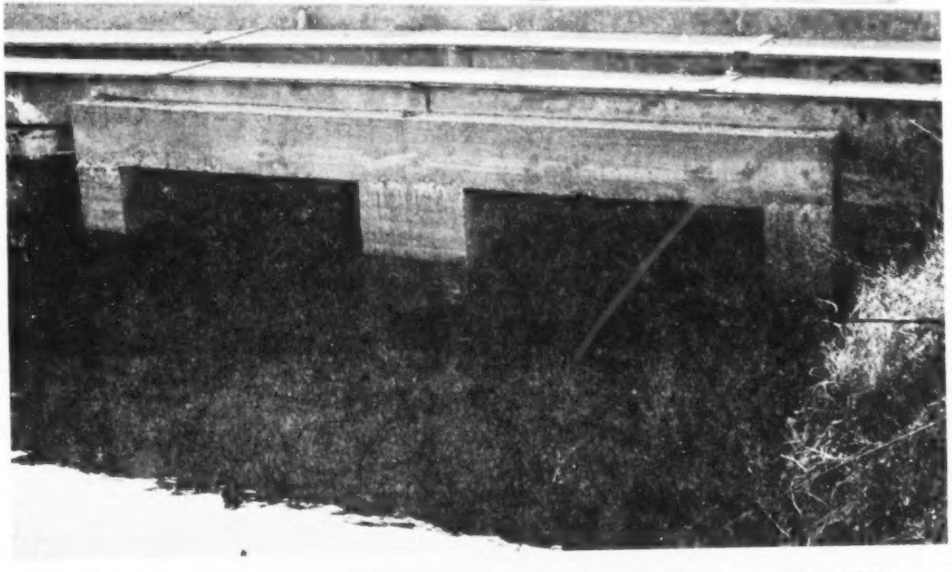


FIG. 10-B, AN OUTFALL FOR ONE OF THE PORT RICHMOND, NEW YORK, REGULATORS

SECTION VI

BAYONNE SEWAGE TREATMENT PLANT DRAINAGE BASIN

BAYONNE, N.J.

The sewage system for Bayonne consists of eighteen mechanical float actuated regulators. The float position for these regulators is determined by the height of flow in the upstream interceptor line. Of the eighteen regulators within this system, overflow from ten regulators bypass to Newark Bay, five bypass to the Kill Van Kull, and three bypass to Upper New York Harbor.

Sewage from the West Side interceptor line flows by gravity to a pump station at East 23rd Street. It is then pumped eastward through a 30" Ø force main to a junction chamber on the East Side interceptor line. Storm water trunk lines have been installed along Avenue E, from East 27th Street south to East 8th Street. This storm flow is then pumped to the Kill Van Kull through a 300 MGD capacity pump station. A storm water pump station (shown on Figure 11) located at Garretson Avenue at the Kill Van Kull, acts to relieve flooding conditions from its low level drainage basin.

The maintenance personnel for the Bayonne sewage system consist of sewage treatment plant workers used on a rotational work assignment basis. Maintenance apparatus was somewhat limited, i.e., pick-up trucks, and the lack of sufficient equipment hindered inspection or maintenance.

During the Commission's inspections, nine of the system's eighteen regulators were found to be inoperable. A follow-up telephone conversation with the plant superintendent indicated that all regulators had been placed back into operable condition since our field investigation.

Additional information relative to the regulators found in this drainage area is shown in Table 1 and Figures 11 through 12.

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TABLE 1 - BAYONNE TREATMENT PLANT DRAINAGE BASIN

BAYONNE, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use				Trunk Line MIMF (cfs)	Interceptor Design Capacity (cfs)
						Res.	Com.	Ind.	Oth.		
1	E. 19th St. and Avenue F	Brown & Brown No. 5-A	Hinged Gate with Mechanical Float System	65	1,000	30	5	45	20	N/A	N/A
2	E. 15th St. East of Avenue E	Brown & Brown No. 8	21" x 32 5/8" Hinged Gate with Mechanical Float System	252	8,700	80	15	0	5	N/A	N/A
3	E. 30th St. and Avenue F	Brown & Brown No. 1	12" x 12" Hinged Gate with Mechanical Float System	45	2,400	80	5	5	10	N/A	N/A
4	E. 34th St. and Avenue E	Brown & Brown No. 8-A	21" x 35 3/8" Hinged Gate with Mechanical Float System	215	11,600	90	5	0	5	N/A	N/A
5	Ingham Ave. and E. 5th Street	Brown & Brown No. 8-B	21" x 38 1/2" Hinged Gate with Mechanical Float System	219	10,000	40	15	35	10	N/A	N/A
6	Broadway & East 1st St.	Brown & Brown No. 1	12" x 12" Hinged Gate with Mechanical Float System	44	2,000	50	15	30	5	N/A	N/A
7	Avenue C & West 1st St.	Brown & Brown No. 3	12" x 18 3/4" Hinged Gate with Mechanical Float System	51	2,500	90	5	0	5	N/A	N/A

TABLE 1 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
1	66" ø	72" ø	24" ø & 42" ø & 30" ø	42" ø & 30" ø	42" ø	Kill Van Kull	9-29-71	--	No access. An oil leak in vicinity of regulator chamber has saturated ground around chamber causing strong fumes in manhole.	11
2	72" ø	72" ø	54" ø	54" ø	54" ø	Kill Van Kull	9-29-71	No	Regulator gate jammed open - needs complete maintenance. Tide gate leaking -- needs cleaning.	11
3	54" ø	54" ø	30" ø	30" ø	30" ø	Upper New York Bay	9-29-71	No	Regulator gate jammed open, float chamber clogged. Tide gate leaking.	12
4	42" ø	48" ø	48" ø	Two 48" ø	72" ø	Upper New York Bay	9-29-71	No	Float chamber clogged. Regulator gate jammed in open position. Tide gate leaking.	12
5	42" ø	54" ø	60" ø	60" ø	60" ø	Kill Van Kull	9-29-71	Yes	Well maintained. Regulator gate and float operable. Slight flow from tide gate.	11
6	33" ø	36" ø	24" ø	24" ø	24" ø	Kill Van Kull	9-29-71	No	Float buried in grit. Cannot move regulator gate. Slight flow from tide gate.	11
7	30" ø	33" ø	24" ø	24" ø	24" ø	Kill Van Kull	9-29-71	No	Regulator gate frozen in open position.	11

TABLE 1 - BAYONNE TREATMENT PLANT DRAINAGE BASIN (Continued)

BAYONNE, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use Res.	Com.	Ind.	Oth.	Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
8	Avenue A North of W. 3rd St.	Brown & Brown No. 0	7 1/2" x 15 3/8" Hinged Gate with Mechanical Float System	36	1,000	5	0	90	5	N/A	N/A
9	Avenue A South of W. 5th St.	Brown & Brown No. 1	12" x 12" Hinged Gate with Mechanical Float System	41	1,000	40	10	40	10	N/A	N/A
10	Edwards Court W. of Ave. A	Brown & Brown No. 7-0	5" x 6" Hinged Gate with Mechanical Float System	3	200	100	0	0	0	N/A	N/A
11	W. 16th St. West of Avenue A	Brown & Brown No. 4-0	7 1/2" x 7 3/4" Hinged Gate with Mechanical Float System	13	600	60	10	0	30	N/A	N/A
12	W. 22nd St. West of Avenue A	Brown & Brown No. 3	12" x 18" 3/4" Hinged Gate with Mechanical Float System	77	3,600	75	5	0	20	N/A	N/A
13	W. 24th St. West of Avenue A	Brown & Brown No. 4-0	7 1/2" x 7 3/4" Hinged Gate with Mechanical Float System	13	400	95	0	0	5	N/A	N/A
14	W. 25th St. West of Avenue A	Brown & Brown No. 3-A	12" x 21" Hinged Gate with Mechanical Float System	90	3,000	60	10	0	30	N/A	N/A
15	W. 30th St. West of Avenue A	Brown & Brown No. 6-0	5" x 7 1/2" Hinged Gate with Mechanical Float System	17	1,000	100	0	0	0	N/A	N/A

TABLE 1 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS: Interceptor Line: Upstream	LINE SIZE CHARACTERISTICS: Interceptor Line: Downstream	LINE SIZE CHARACTERISTICS: Trunk Line	LINE SIZE CHARACTERISTICS: By-Pass Line	LINE SIZE CHARACTERISTICS: Outfall	Receiving Waterway	INSPECTION DATA: Date	INSPECTION DATA: Operable (Yes or No)	INSPECTION DATA: Comments	Figure No. for Location of Regulator
8	24" ø	30" ø	Two 18" ø	24" ø	24" ø	Newark Bay	9-29-71	No	Regulator gate frozen in open position. Chain off regulator pulley. Tide gate open slightly.	11
9	--	24" ø	24" ø	24" ø	24" ø	Newark Bay	9-29-71	No	Float covered with grit. Regulater gate not removable.	11
10	--	12" ø CA	12" ø CI	12" ø CI	12" ø CI	Newark Bay	3-27-72	--	No Access.	11
11	12" ø CA	18" ø CA	24" ø CI	24" ø CI	24" ø CI	Newark Bay	3-27-72	Yes	--	11
12	18" ø CA	24" ø CA	36" ø Steel	36" ø Steel	36" ø Steel	Newark Bay	3-27-72	Yes	--	11
13	48" ø CA	48" ø CA	16" ø	16" ø	16" ø	Newark Bay	3-27-72	Yes	--	12
14	42" ø RC	48" ø CA	36" ø Steel	36" ø Steel	36" ø Steel	Newark Bay	3-27-72	Yes	--	12
15	36" ø RC	42" ø RC	18" ø CI	18" ø CI	18" ø CI	Newark Bay	3-27-72	Yes	--	12

TABLE 1 - BAYONNE TREATMENT PLANT DRAINAGE BASIN (Continued)

BAYONNE, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use Res.	Com.	Ind.	Oth.	Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
16	Lincoln Parkway West of Avenue A	Brown & Brown No. 6-A	16" x 30 7/8" Hinged Gate with Mechanical Float System	147	6,000	70	0	0	30	N/A	N/A
17	Hudson Blvd. & 59th St.	N/A	Hinged Gate with Mechanical Float System	109	4,300	55	20	15	10	N/A	N/A
18	E. 50th St. East of Avenue E	Brown & Brown No. 7-A	Hinged Gate with Mechanical Float System	159	7,200	70	20	5	5	N.A	N/A

NOTES FOR TABLE 1:

Regulator Data - taken from regulator detail sheets (1949-50) supplied by personnel at the Bayonne Treatment Plant.

Drainage Area Data - boundaries determined from City of Bayonne Existing Sewer Line Map (1962). Acreage calculated from the layout of drainage area boundaries.

Population Data - based on 1970 Federal Census (Census Tract P-1) supplied by personnel at Bayonne City Engineer's Office.

Land Use Data - estimated from City of Bayonne Zoning Map (1969).

Hydraulic Data - not available.

TABLE 1 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS: Interceptor Line: Upstream	LINE SIZE CHARACTERISTICS: Interceptor Line: Downstream	LINE SIZE CHARACTERISTICS: Trunk Line	LINE SIZE CHARACTERISTICS: By-Pass Line	LINE SIZE CHARACTERISTICS: Outfall	Receiving Waterway	INSPECTION DATA: Date	INSPECTION DATA: Operable (Yes or No)	INSPECTION DATA: Comments	Figure No. for Location of Regulator
16	36" ø RC	36" ø RC	36" ø CI	36" ø CI	36" ø CI	Newark Bay	3-27-72	Yes	--	12
17	--	33" ø	36" ø CB	36" ø CB	36" ø CB	Newark Bay	3-27-72	No.	This is a new regulator, recently built. It replaces Brown & Brown regulator No. 4-A which was at site and was removed because of new construction. Regulator gate was closed. Dry weather flow by-passing.	12
18	--	42" ø	48" ø	48" ø	48" ø	Upper New York Bay	9-29-71	No	Float weighted down to keep regulator gate in open position. Needs greasing and general maintenance. Tide gate jammed open -- fixed by crew while at chamber.	12

NOTES FOR TABLE 1 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and City of Bayonne Existing Sewer Line Map.

Inspection Data - according to telephone conversation of May 19, 1972 with the Bayonne Treatment Plant Superintendent, all regulators which were found to be inoperable during inspections have been put in good condition.

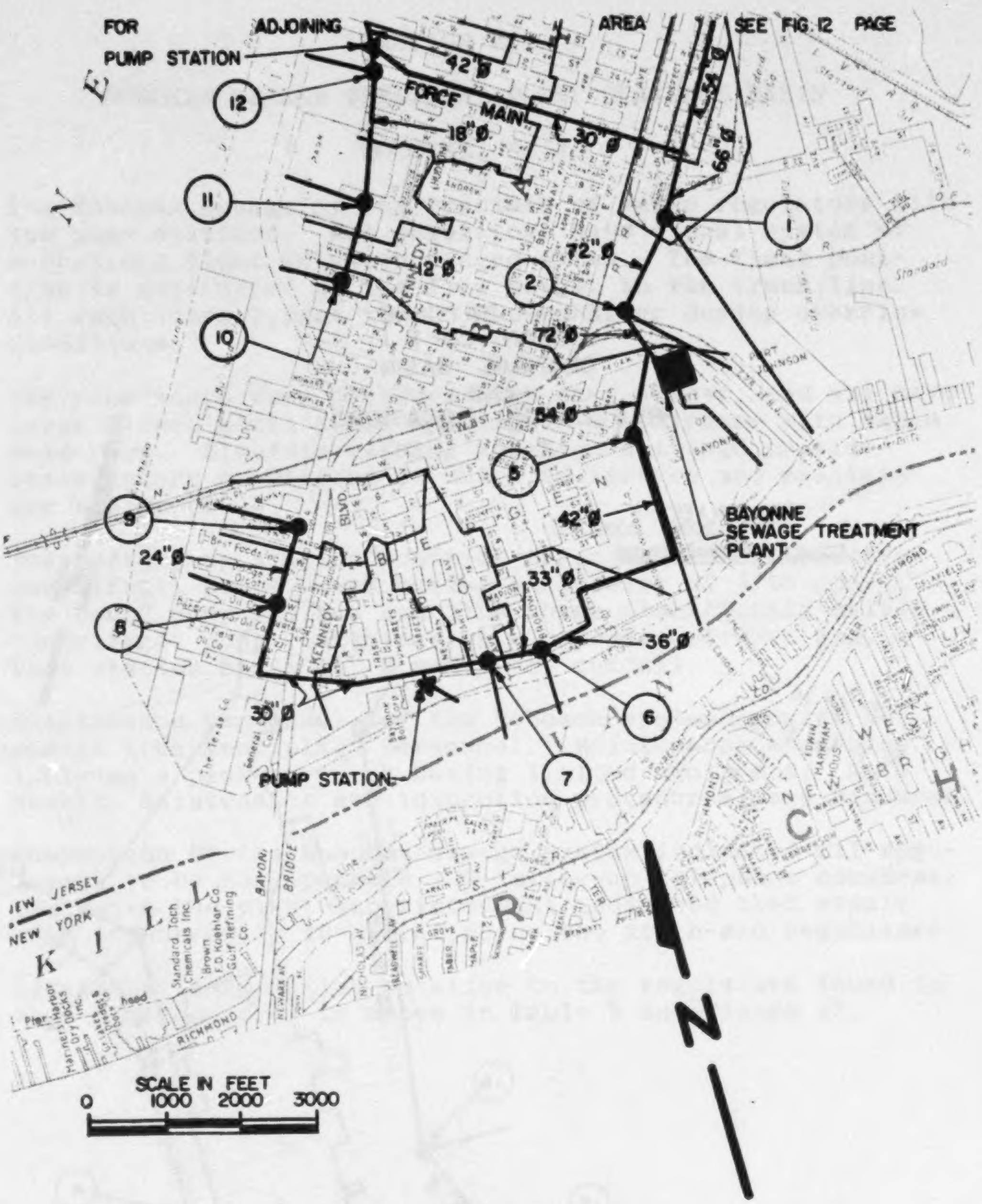
FOR ADJOINING AREA SEE FIG. 12 PAGE
PUMP STATION
42"Ø
12
FORCE MAIN
18"Ø
30"Ø
54"Ø
66"Ø
11
1
72"Ø
12"Ø
2
10
72"Ø
54"Ø
5
42"Ø
BAYONNE SEWAGE TREATMENT PLANT
9
24"Ø
33"Ø
8
36"Ø
6
30"Ø
PUMP STATION
7
NEW JERSEY
NEW YORK
K I L L
R
C H
N
SCALE IN FEET
0
1000
2000
3000

FIG. II BAYONNE
HUDSON CO. N.J.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

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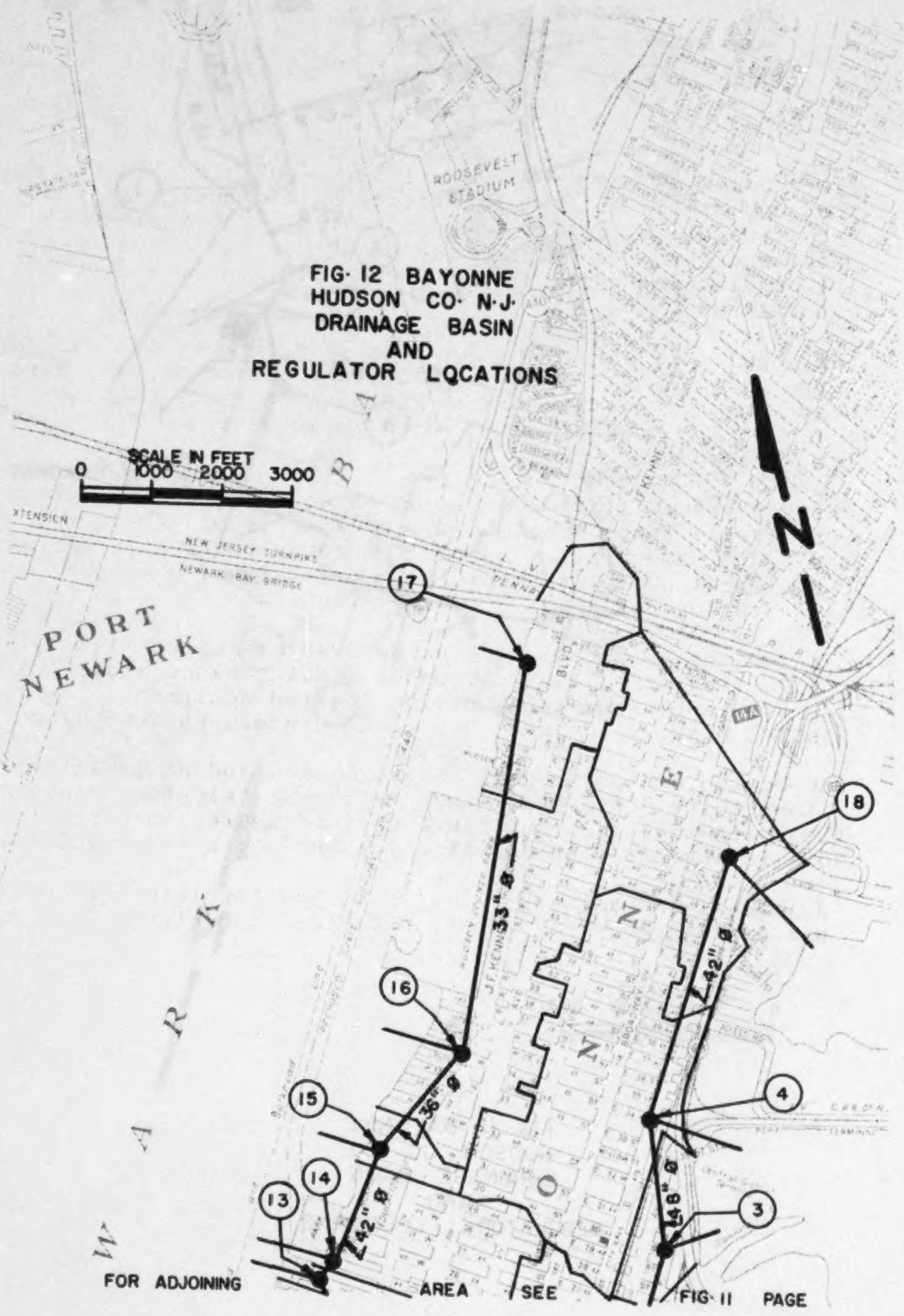


FIG. 12 BAYONNE HUDSON CO. N.J. DRAINAGE BASIN AND REGULATOR LOCATIONS

ROOSEVELT STADIUM
SCALE IN FEET
0
1000
2000
3000
EXTENSION
NEW JERSEY TURNPIKE
NEWARK BAY BRIDGE
PORT NEWARK
N
17
18
16
15
14
13
4
3
33" Ø
42" Ø
36" Ø
42" Ø
48" Ø
J.F. KENNEDY BLVD.
BROADWAY
B
A
K
R
A
W
E
N
N
O

FOR ADJOINING AREA SEE FIG. 11 PAGE

SECTION VII

HOBOKEN SEWAGE TREATMENT PLANT DRAINAGE BASIN

HOBOKEN, N. J.

The Hoboken sewage system consists of seven regulators with two pump stations. All regulators have a dual system of mechanical float actuated hinged gates. The float position is determined by the flow height in the trunk line. All regulators bypass to the Hudson River during overflow conditions.

The regulators were designed with easy access, and all have large hinged metal doors opening to a staircase with ample head-room. Electric lighting and high ceilings provide satisfactory conditions in which to service and maintain the equipment.

The North pump station contains three electrically driven centrifugal pumps, each having a capacity of 4500 gpm. The South pump station contains three electrically driven centrifugal pumps, each having a capacity of 6200 gpm. This station has a 15" Ø emergency outfall.

Maintenance personnel for the Hoboken system consist of sewage treatment plant personnel. Maintenance apparatus includes a pick-up truck having limited equipment. As a result, maintenance and inspection procedures were hindered.

Inspection of the Hoboken sewage system indicated all regulators to be non-operable. A follow-up telephone conversation with the plant superintendent indicated that repair work is currently in operation on the north-end regulators.

Additional information relative to the regulators found in this drainage area is shown in Table 2 and Figure 13.

TABLE 2 - HOBOKEN TREATMENT PLANT DRAINAGE BASIN

HOBOKEN, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
						Res.	Com.	Ind.	Oth.		
1	Observer Highway & Court Alley	Brown & Brown Nos. 4-A & 5-A	12" x 26 5/16" & 16" x 25 5/8" Hinged Gates with Independent Mechanical Float Systems	124	N/A	80	5	10	5	N/A	N/A
2	River & Newark Streets	Brown & Brown Nos. 4-0 & 000	7 1/2" x 7 3/4" & 7 1/2" x 9 3/4" Hinged Gates with Independent Mechanical Float Systems	76	N/A	85	5	5	5	N/A	N/A
3	River & Third Streets	Brown & Brown Nos. 1 & 0	12" x 12" & 7 1/2" x 15 3/8" Hinged Gates with Independent Mechanical Float Systems	117	N/A	80	5	10	5	N/A	N/A
4	River & Fourth Streets	Brown & Brown Nos. 00 & 00	Two 7 1/2" x 12 3/8" Hinged Gates with Independent Mechanical Float Systems	114	N/A	80	5	5	10	N/A	N/A
5	Hudson & Eleventh Streets	Brown & Brown Nos. 1 & 0	12" x 12" & 7 1/2" x 15 3/8" Hinged Gates with Independent Mechanical Float Systems	177	N/A	50	5	40	5	N/A	N/A
6	Hudson & Fourteenth Streets	Brown & Brown Nos. 7-0 & 7-0	Two 5" x 6" Hinged Gates with Independent Mechanical Systems	21	N/A	60	5	30	5	N/A	N/A
7	Fourteenth Street North of Hudson Street	Brown & Brown Nos. 5-A & 0	Two 5" x 6" Hinged Gates with Independent Mechanical Systems	62	N/A	0	0	75	25	N/A	N/A

TABLE 2 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall					
	Upstream	Downstream					Date	Operable (Yes or No)	Comments	
1	--	42" ø	96" x 48"	Two 48" ø CI	Two 48" ø CI	Hudson River	9-30-71	No	Regulator gate jammed open; floats under 6" of grit and debris; chains corroded.	13
2	42" ø	45" ø	42" ø	42" ø	2'-6"x 4'-0"	Hudson River	9-29-71	No	Float missing, chain broken, regulator gate jammed open. Tide gate clogged.	13
3	45" ø	48" ø	72" ø Brick	72" ø Brick	72" ø Brick	Hudson River	9-29-71	No	Regulator gate frozen open. Could not operate float. Debris in tide gate.	13
4	48" ø	48" ø	7'-0"x 4'-9"	7'-0"x 4'-9"	6'-0"x 4'-9" Wood	Hudson River	9-29-71	No	Could not operate float. Weight for float on work bench. Regulator gate frozen open.	13
5	36" ø	36" ø	36" ø & 60" ø	7'-0"x 4'-9"	7'-0"x 4'-9"	Hudson River	9-29-71	No	Regulator gate frozen open. Could not operate.	13
6	30" ø	36" ø	30"x42" Brick	30"x42" Brick	30"x42" Brick	Hudson River	9-29-71	No	Regulator gate being held open with rope. Both floats broken.	13
7	--	30" ø	7'-0"x 4'-9"	7'-0"x 4'-9"	7'-0"x 4'-9"	Hudson River	9-29-71	No	Regulator gate frozen open. Grit and debris in float chamber.	13

TABLE 2 - HOBOKEN TREATMENT PLANT DRAINAGE BASIN (Continued)

HOBOKEN, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
						Res.	Com.	Ind.	Oth.		
South Pump Station	Fifth & River Streets	--	Electrically Driven Centrifugal	--	--	--	--	--	--	--	--
North Pump Station	Eleventh & Hudson Streets	--	Electrically Driven Centrifugal	--	--	--	--	--	--	--	--

NOTES FOR TABLE 2:

Regulator Data - taken from regulator detail sheets (1957) supplied by personnal at the Hoboken Treatment Plant.

Drainage Area Data - boundaries determined from City of Hoboken Existing Sewer Line Maps (1954). Acreage calculated from the layout of drainage area boundaries.

Population Data - not available.

Land Use Data - estimated from City of Hoboken Land Use Map (1950) prepared for the City of Hoboken Housing Authority.

Hydraulic Data - not available.

TABLE 2 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
South Pump Station	--	24" ø Force Main	--	15" ø	15" ø	Hudson River	9-30-71	Yes	Three Pumps with 6200 GPM Capacity Each.	13
North Pump Station	--	48" ø Force Main	--	--	--	--	9-30-71	Yes	Three Pumps with 4500 GPM Capacity Each.	13

NOTES FOR TABLE 2 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and City of Hoboken Existing Sewer Line Maps.

Inspection Data - according to telephone conversation of May 19, 1972 with the Hoboken Treatment Plant Superintendent, plant personnel have been working on North End regulators since inspection.

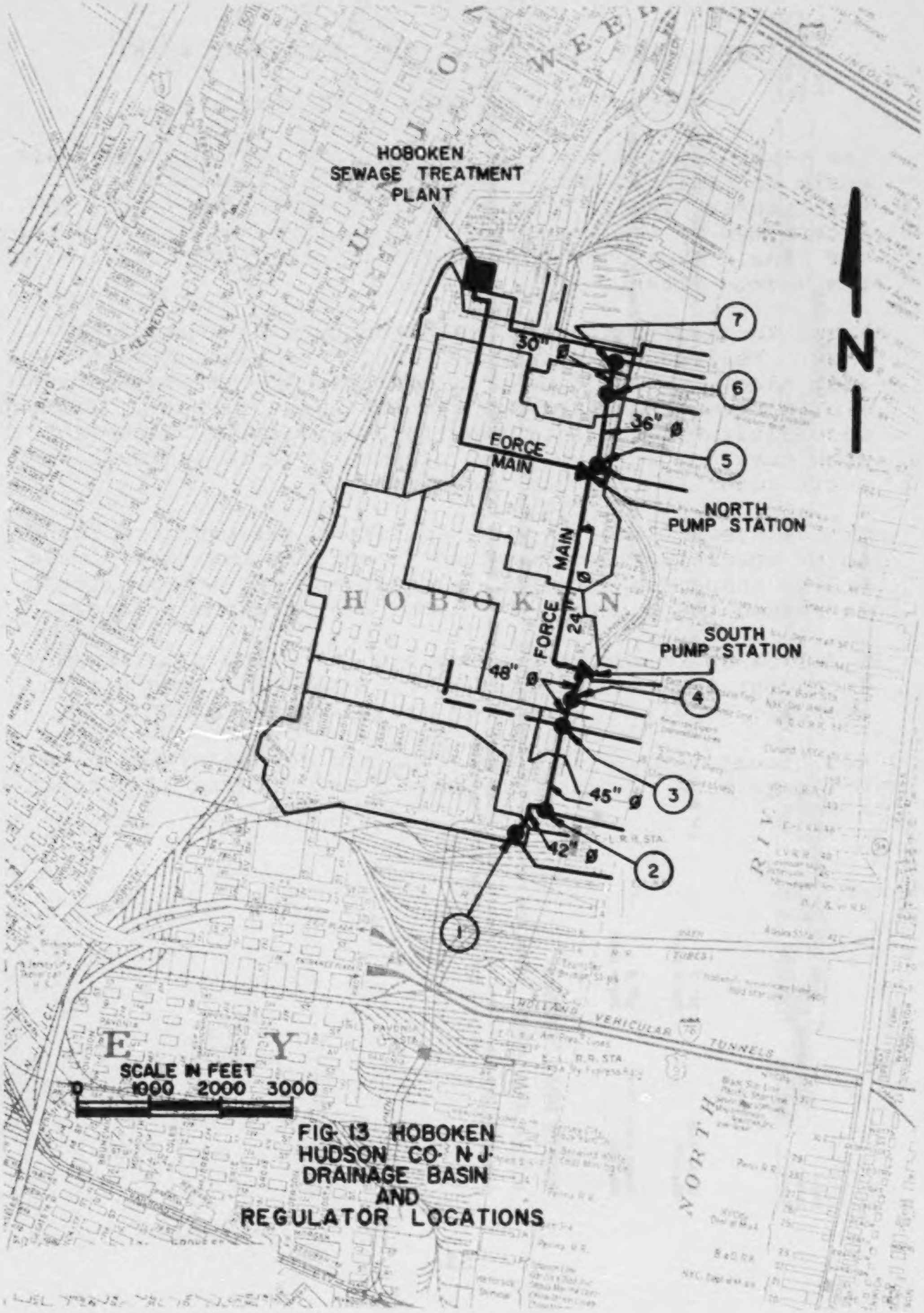

HOBOKEN
SEWAGE TREATMENT
PLANT
7
30" Ø
6
36" Ø
FORCE
MAIN
5
NORTH
PUMP STATION
FORCE MAIN
24" Ø
H O B O K E N
SOUTH
PUMP STATION
48" Ø
4
45" Ø
3
42" Ø
2
1
N
E Y
SCALE IN FEET
0 1000 2000 3000

FIG 13 HOBOKEN
HUDSON CO. N.J.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

SECTION VIII

JERSEY CITY EAST SIDE SEWAGE TREATMENT PLANT

DRAINAGE BASIN, JERSEY CITY, N.J.

The sewage system for the Jersey City, East Side drainage basin consists of twenty-one mechanical float actuated regulators. The float position for these regulators is determined by the height of flow in the upstream interceptor line. When overflow occurs, all regulators bypass to the Hudson River.

Regulator maintenance is performed by a five-man field crew. Their work assignments include servicing both the East Side and West Side treatment plant regulators (there are thirteen regulators in the West Side system). Maintenance equipment includes two trucks specially fitted for such work, as well as other necessary tools and gear to satisfactorily maintain the system.

Of the system's twenty-one regulators, eleven were found to be operable, seven were non-operable, and three could not be inspected since heavy equipment was not available to remove the concrete slab over access manhole covers.

A follow-up telephone conversation with the plant superintendent indicated that all regulators had been put in operable condition since our field investigation.

Additional information regarding the regulators with this drainage area is found in Table 3 and Figures 14 through 16.

TABLE 3 - JERSEY CITY, EAST SIDE TREATMENT PLANT DRAINAGE BASIN

JERSEY CITY, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
						Res.	Com.	Ind.	Oth.		
E-1	Brown Place East of Princeton Ave.	Brown & Brown No. 7	16" x 34 1/4" Hinged Gate with Mechanical Float System	207	15,500	70	15	10	5	N/A	N/A
E-2	Foot of Richard Street	Brown & Brown No. 5-A	16" x 24" Hinged Gate with Mechanical Float System	246	16,000	55	15	15	15	N/A	N/A
E-3	Foot of Phillip Street West of N. J. Tpk. overpass	Brown & Brown No. 5-A	16" x 24" Hinged Gate with Mechanical Float System	317	14,100	60	15	20	5	N/A	N/A
				(Combined data for regulators E-3 and E-4)							
E-4	Foot of Phillip St. West of N. J. Tpk. overpass	Brown & Brown No. 1	12" x 12" Hinged Gate with Mechanical Float System								
E-5	Off Johnson St. Foot of Big Basin (Pine St. Regulator)	Brown & Brown No. 2	12" x 15" Hinged Gate with Mechanical Float System	203	4,300	35	15	40	10	N/A	N/A
E-6	Off Johnson St. Foot of Big Basin (Mill Creek Regulator)	Brown & Brown No. 9-B	21" x 47 5/8" Hinged Gate with Mechanical Float System	153	1,800	80	5	5	10	N/A	N/A
E-7	Washington St. South of Essex Street	Brown & Brown No. 7-0	5" x 6" Hinged Gate with Mechanical Float System	7	200	30	10	60	0	N/A	N/A

TABLE 3 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall					
	Upstream	Downstream					Date	Operable (Yes or No)	Comments	
E-1	--	42" ø RC	60" ø CB	60" ø CB	60" ø CB	Upper N.Y. Bay	9-22-71	No	Regulator gate jammed open. Float chamber flooded and filled with rocks & debris.	14
E-2	42 ø RC	54" ø RC	48" ø CI & 36" ø CI	54" ø CB	54" ø CB	Upper N.Y. Bay	9-7-71	--	No access - need heavy equipment to remove concrete slab over manhole cover.	14
E-3	54" ø RC	--	96" ø STEEL	96" ø STEEL	96" ø STEEL	Upper N.Y. Bay	9-22-71	Yes	Operable condition; however, heavy accumulation of grit & debris needs to be removed.	15
E-4	--	66" ø RC	72" ø CONC	72" ø CONC	72" ø CONC	Upper N.Y. Bay	9-22-71	Yes	Operable condition; however, heavy accumulation of grit & debris needs to be removed.	15
E-5	84" ø RC	84" ø RC	18'-0" x 7'-8" STEEL ARCH	18'-0" x 7'-8" STEEL ARCH	18'-0" x 7'-8" STEEL ARCH	Hudson River	9-23-71	--	Unable to make judgement since Crane necessary to lift cover & see floats.	15
	(Data applies to regulators E-5 & E-6)									
E-6						Hudson River	9-23-71	--	Unable to make judgement since Crane necessary to lift cover & see floats.	15
E-7	36" ø RC BR INT	24" ø RC BR INT to 36" ø BR INT	48" x 36" OB	48" x 36" OB	48" x 36" OB	Hudson River	9-22-71	Yes	Clean and well maintained. Tide gate open slightly.	15

TABLE 3 - JERSEY CITY, EAST SIDE PLANT DRAINAGE BASIN (Continued)

JERSEY CITY, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
						Res.	Com.	Ind.	Oth.		
E-8	Essex St. East of Hudson St.	Brown & Brown No. 2	12" x 15" Hinged Gate with Mechanical Float System	26	1,000	10	5	75	10	N/A	N/A
E-9	Sussex St. East of Hudson St.	Brown & Brown No. 1	12" x 12" Hinged Gate with Mechanical Float System	3	100	5	5	90	0	N/A	N/A
E-10	Grand St. West of Bulkhead	Brown & Brown No. 4-0	7 1/2" x 7 3/4" Hinged Gate with Mechanical Float System	550	31,000	80	5	10	5	N/A	N/A
E-11	York St. West of Bulkhead	Brown & Brown No. 3	12" x 18 3/4" Hinged Gate with Mechanical Float System	233	8,400	55	15	15	15	N/A	N/A
E-12	Exchange Pl. West of Bulkhead	Brown & Brown No. 5	16" x 21 5/8" Hinged Gate with Mechanical Float System	6	0	0	70	0	30	N/A	N/A
E-13	Pearl St. East of Washington St.	Brown & Brown No. 5-0	5" x 9 1/4" Hinged Gate with Mechanical Float System	22	0	10	5	25	60	N/A	N/A
E-14	Foot of Bay St. & Penn R.R.	Brown & Brown No. 2	12" x 15" Hinged Gate with Mechanical Float System	54	2,800	0	30	30	40	N/A	N/A

TABLE 3 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
E-8	36" ø RC BR INT	24" ø RC BR INT to 36"ø RC BR INT	36" ø CB	36" ø CB	36" ø CB	Hudson River	9-23-71	Yes	Clean and well maintained. Tide gate open slightly.	15
E-9	36" ø RC BR INT	36" ø RC BR INT	30" x 20" OB	30" x 20" OB	30" x 20" OB	Hudson River	9-23-71	No	Regular gate chain for pulley off track making gate inoperable. Tide gate open.	15
E-10	36" ø RC BR INT	18" ø RC BR INT To 36" ø RC BR INT	84" ø CB	84" ø CB	84" ø CB	Hudson River	9-24-71	No	Float frozen in down position causing regulator gate to remain in open position.	15
E-11	30" ø RC BR INT	36" ø RC BR INT	36" x 48" OB	36" x 48" OB	36" x 48" OB	Hudson River	9-23-71	Yes	Good condition, clean and well maintained.	15
E-12	--	30" ø RC BR INT	36" x 48" OB	36" x 48" OB	36" x 48" OB	Hudson River	9-23-71	Yes	Only very slight back flow from tide gate.	15
E-13	24" ø RC	24" ø RC BR INT to 72" ø RC	30" x 36" OB	30" x 36" OB	30" x 36" OB	Hudson River	9-23-71	No	Blockage in regulator gate. Needs cleaning of regulator gate and float chamber.	15
E-14	72" ø RC	24" ø RC BR INT to 72" ø RC	30" x 40" OB	30" x 40" OB	30" x 40" OB	Hudson River	9-23-71	No	Float Chamber full of debris. Tide gate lodged open slightly.	15

TABLE 3 - JERSEY CITY, EAST SIDE PLANT DRAINAGE BASIN (Continued)

JERSEY CITY, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use Res.	Com.	Ind.	Oth.	Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
E-15	Second & Provost Streets	Brown & Brown No. 3	12" x 18 3/4" Hinged Gate with Mechanical Float	88	6,600	55	40	0	5	N/A	N/A
E-16	Foot of Sixth Street	Brown & Brown No. 00	7 1/2" x 12 3/8" Hinged Gate with Mechanical Float System	54	1,600	60	20	15	5	N/A	N/A
E-17	Eight & Provost Streets	Brown & Brown No. 8	21" x 32 5/8" Hinged Gate with Mechanical Float System	93	4,700	40	10	15	35	N/A	N/A
E-18	Twelfth & Henderson Streets	Brown & Brown No. 2	12" x 15" Hinged Gate with Mechanical Float System	240	19,600	0	40	40	20	N/A	N/A
E-19	Boyle Pl. North of Holland Tunnel exit	Brown & Brown No. 6	16" x 27 1/2" Hinged Gate with Mechanical Float System	16	2,200	60	10	20	10	N/A	N/A
E-20	Boyle Pl. North of Holland Tunnel exit	Brown & Brown No. 000	7 1/2" x 9 3/4" Hinged Gate with Mechanical Float System	127	--	0	0	100	0	N/A	N/A
E-21	Boyle Pl. North of Holland Tunnel exit	Brown & Brown No. 5-A	16" x 24" 5/8" Hinged Gate with Mechanical Float System	270	25,100	90	5	0	5	N/A	N/A

TABLE 3 (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line Upstream	Interceptor Line Downstream	Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
E-15	72" ø RC	72" ø RC	48" ø CB	48" ø CB	48" ø CI	Hudson River	9-23-71	No	Telltale pipe clogged. Debris and grit holding float in down position. Tide gate open slightly.	15
E-16	--	18" ø RC BR INT to 36" ø RC BR INT	48" ø CB	48" ø CB	48" ø CB	Hudson River	9-23-71	Yes	Bar screens need cleaning. Tide gate open slightly.	16
E-17	--	36" ø RC BR INT	Two 3'-0" x 4'-0"CB	48" ø CB	48" ø CB	Hudson River	9-23 71	Yes	Needs cleaning. Tide gate jammed open slightly.	16
E-18	60" ø RC	66" ø RC	3'-0" x 4'-0" CB	96" ø STEEL	96" ø STEEL	Hudson River	9 23-71	Yes	Needs Cleaning.	16
E-19	--	--	5'-0" ø STEEL	5'-0" ø STEEL	5'-0" ø STEEL	Hudson River	9-23-71	Yes	Needs Cleaning.	16
E 20	--	42" ø RC	48" ø RC	3'-0" x 4'-0" CB	3'-0" x 4'-0" CB	Hudson River	9-23-71	No	Regulator in open position at all times due to trash & grit clogging float chamber.	16
E-21	-	--	66" ø	66" ø	66" ø	Hudson River	9-23-71	Yes	Bar screen needs cleaning. Tide gate closed.	16

NOTES FOR TABLE 3 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Jersey City Existing Sewer Plans.

Inspection Data - according to telephone conversation on May 19, 1972 with the Jersey City Treatment Plant Superintendent, all regulators which were found to be inoperable during inspection have been put in good condition.

TABLE 3 - JERSEY CITY, EAST SIDE PLANT DRAINAGE BASIN (Continued)

JERSEY CITY, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use				Trunk Line MDF (cfs)	Interceptor Design Capacity (cfs)
						Res.	Com.	Ind.	Oth.		

NOTES FOR TABLE 3:

Regulator Data - taken from regulator detail sheets (1954) supplied by personnel at the Jersey City Treatment Plant.

Drainage Area Data - boundaries determined from City of Jersey City Existing Sewer Plans supplied by Chief Engineer, Jersey City. Acreage calculated from the layout of drainage area boundaries.

Population Data - based on 1970 Federal Census data supplied by the Jersey City Division of Planning.

Land Use Data - estimated from Existing Land Use Map in The City: A Time for Change - A Report on Jersey City's Comprehensive Master Plan (1966).

Hydraulic Data - not available.

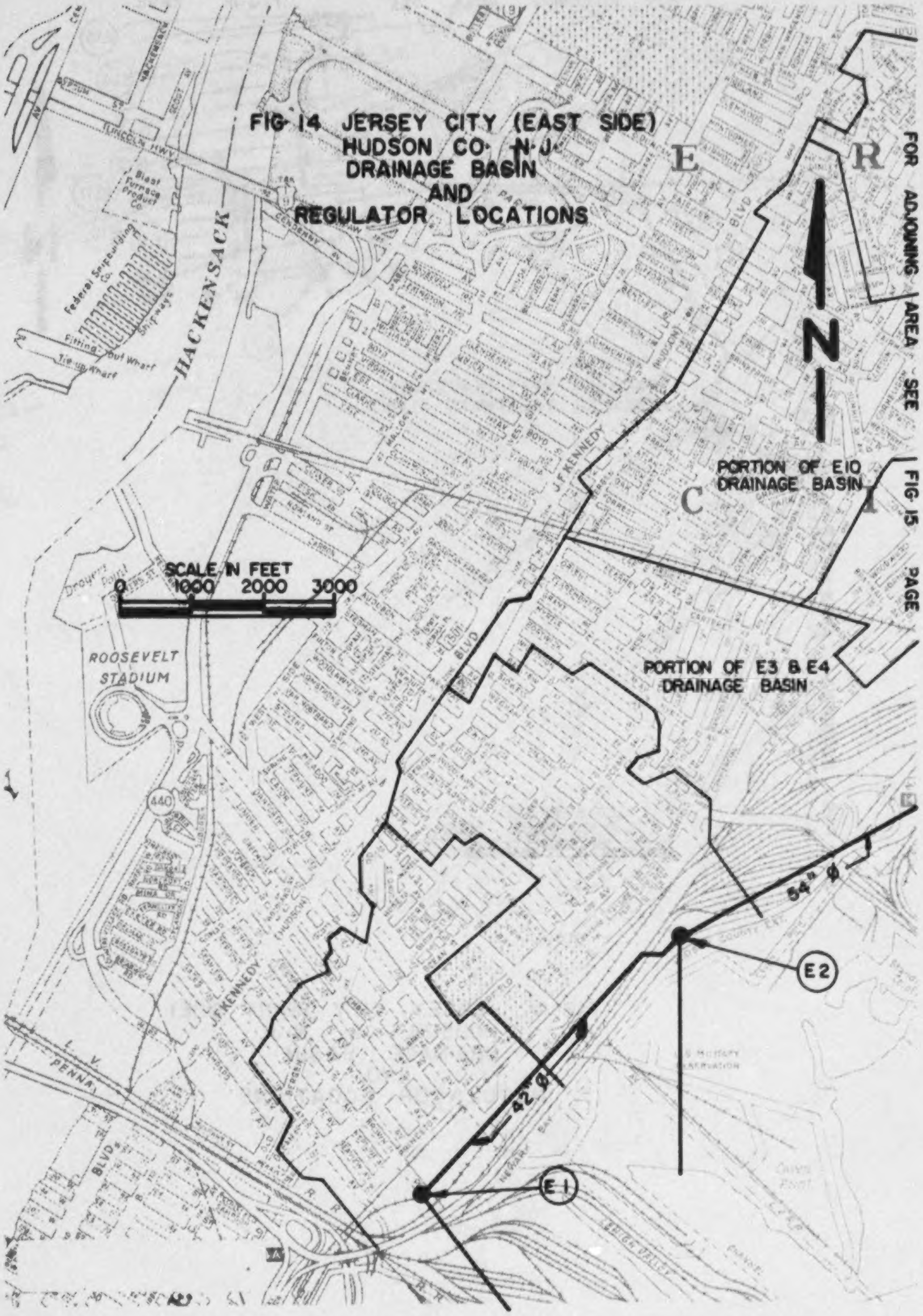
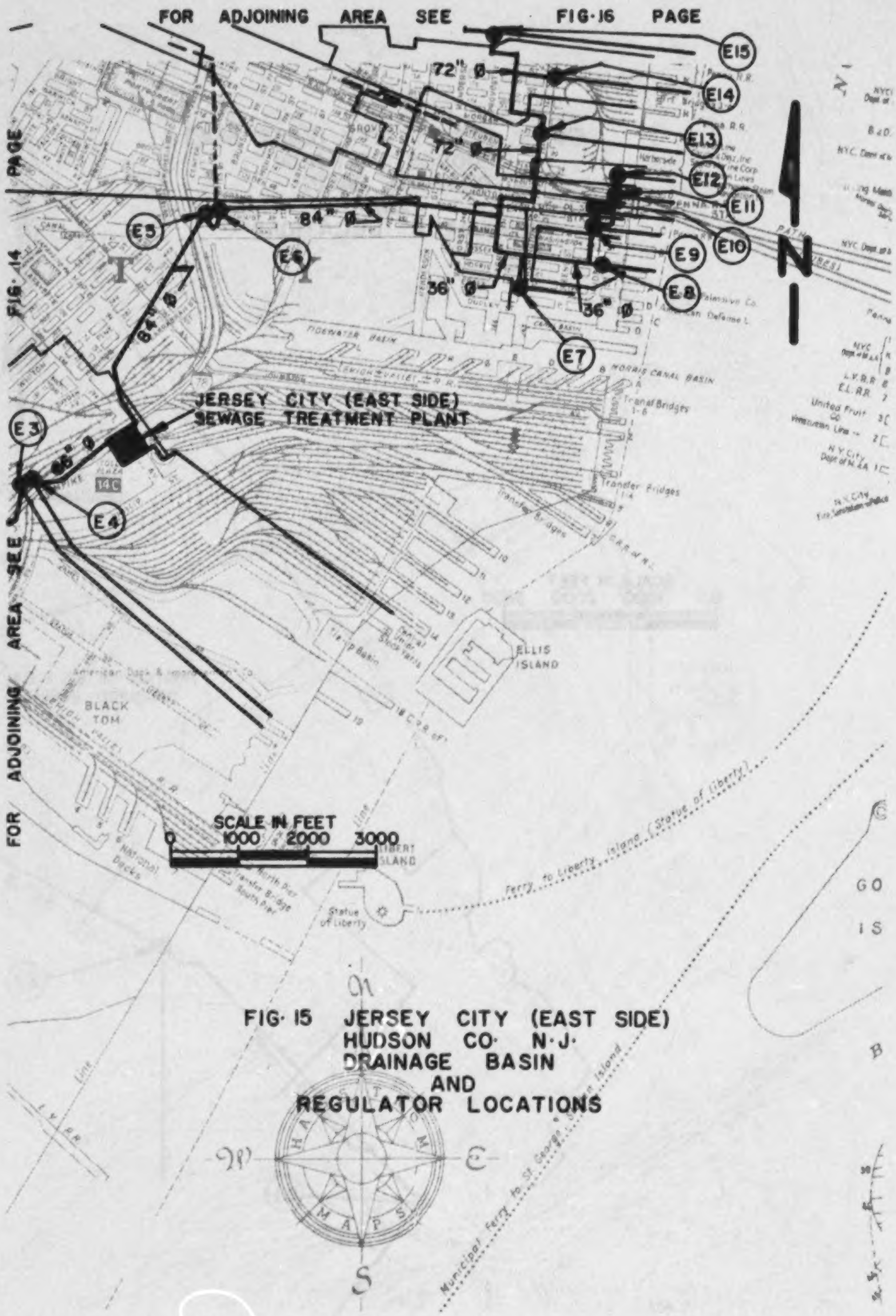


FIG 14 JERSEY CITY (EAST SIDE)
HUDSON CO. N.J.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

FOR ADJOINING AREA SEE FIG 15 PAGE
N
PORTION OF E10 DRAINAGE BASIN
PORTION OF E3 & E4 DRAINAGE BASIN
SCALE IN FEET
0 1000 2000 3000
ROOSEVELT STADIUM
HACKENSACK
J.F.KENNEDY
BLVD
HUDSON
PENNA
L V
440
54" Ø
42" Ø
E2
E1
U.S. MILITARY RESERVATION
E
R
C
I



FOR ADJOINING AREA SEE FIG·16 PAGE
FOR ADJOINING AREA SEE FIG·14 PAGE
E3
E4
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E15
72" Ø
72" Ø
84" Ø
84" Ø
36" Ø
36" Ø
66" Ø
JERSEY CITY (EAST SIDE)
SEWAGE TREATMENT PLANT
14C
N
TIDEWATER BASIN
MORRIS CANAL BASIN
Transfer Bridges
ELLIS ISLAND
BLACK TOM
American Dock & Improvement Co.
National Docks
LIBERTY ISLAND
Statue of Liberty
Ferry to Liberty Island (Statue of Liberty)
Municipal Ferry to St. George Staten Island
SCALE IN FEET
0
1000
2000
3000
N
W
E
S

FIG· 15 JERSEY CITY (EAST SIDE)
HUDSON CO· N·J·
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

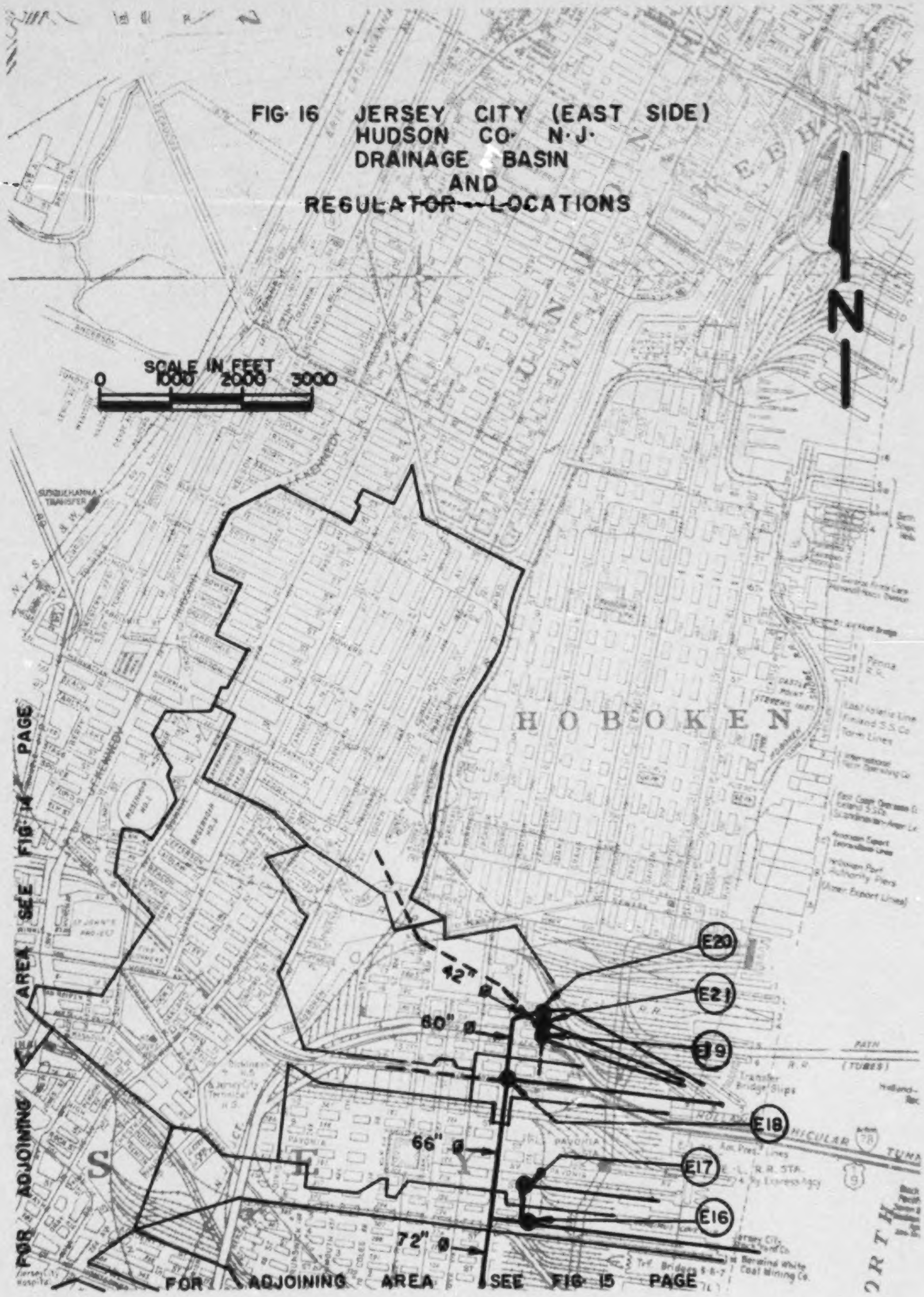


FIG 16 JERSEY CITY (EAST SIDE)
HUDSON CO. N.J.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

SCALE IN FEET
0
1000
2000
3000
N
HOBOKEN
E20
E21
E19
E18
E17
E16
42" ø
60" ø
66" ø
72" ø
FOR ADJOINING AREA SEE FIG 14 PAGE
FOR ADJOINING AREA SEE FIG 15 PAGE

SECTION IX

WEST NEW YORK SEWAGE TREATMENT PLANT

DRAINAGE BASIN, WEST NEW YORK, N. J.

The West New York combined sewage system is a gravity flow type having no pump stations. There is only one regulator in the system. This regulator is a diversion chamber located on Hillside Road, east of Kennedy Boulevard. Sewage from West New York, the northern part of Union City, and Weehawken Heights flows into this regulator.

At the time of inspection, the chamber's bar screens, which precede the influent line to the treatment plant, were clean, with no sewage bypassing over the stationary weir.

Treatment plant personnel are used to maintain this regulator, on a regularly scheduled basis.

Additional information regarding the regulator within this drainage area is found in Table 4 and Figure 17.

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TABLE 4 - WEST NEW YORK TREATMENT PLANT DRAINAGE BASIN

WEST NEW YORK, NEW JERSEY

Regulator Number	Location	Manufacturer (Reference Number)	Type	Drainage Area (Acres)	Population-Residential	Percent Land Use				Trunk Line MDF (cfs)	Interceptor Design Capacity (cfs)
						Res.	Com.	Ind.	Oth.		
1	Hillside Road East of John F. Kennedy Boulevard	--	Bar screen over fixed orifice	738	N/A	50	20	20	10	N/A	N/A

NOTES FOR TABLE 4:

Regulator Data - taken from detail sheets in Interstate Sanitation Commission files.

Drainage Area Data - boundaries determined from (West New York) Plan Map of Drainage Area. Acreage calculated from the layout of the drainage area boundaries.

Population Data - not available.

Land Use Data - estimated from Official Zoning Map - Town of West New York (1965).

Hydraulic Data - not available.

Table 4 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
1	--	27" ∅ RC	48" ∅ RC	54" ∅ RC	54" ∅ RC	Hudson River	10-15-71	Yes	Bar screen clean; all flow to plant--No flow to outfall.	17

NOTES FOR TABLE 4 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets.

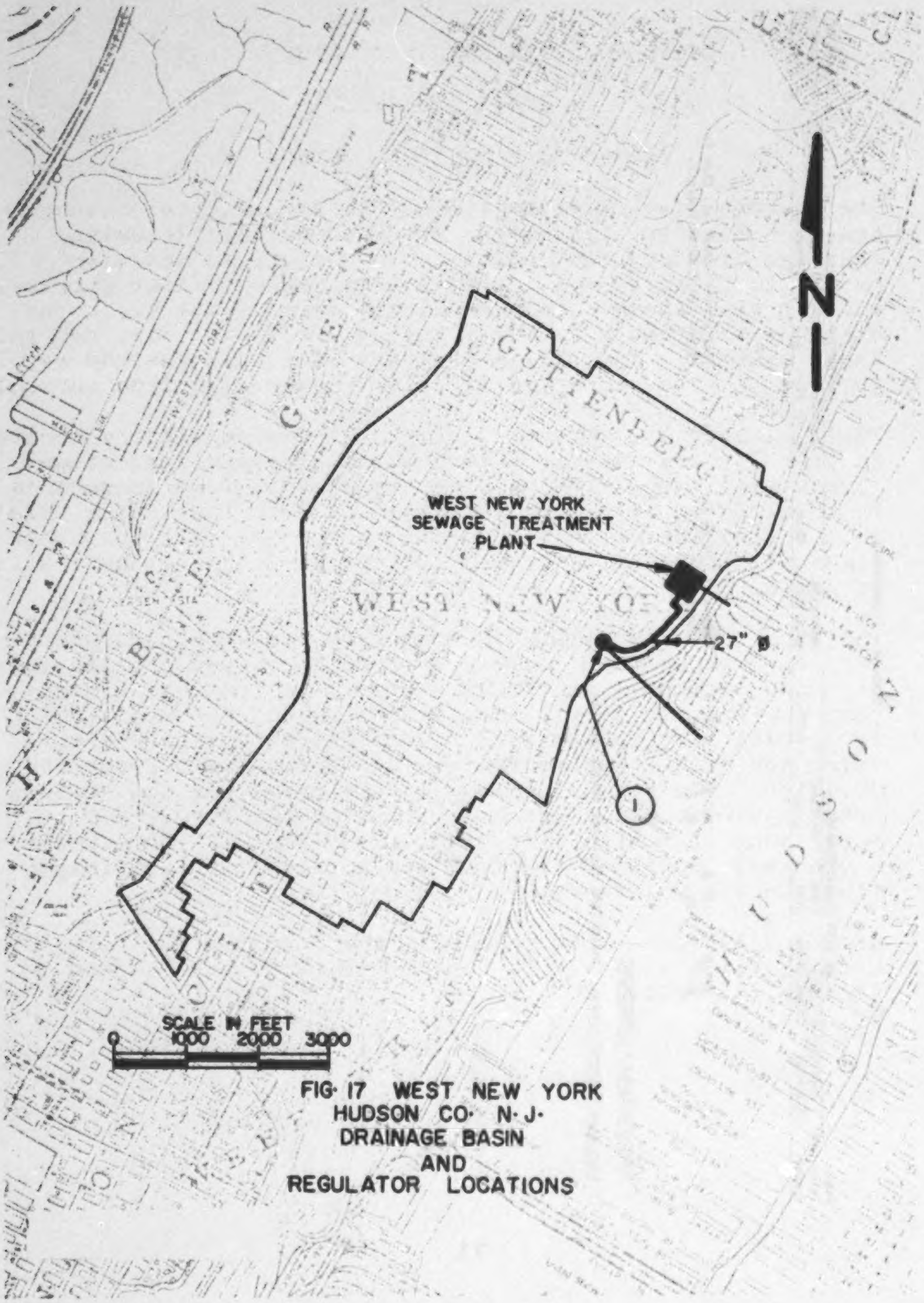

N
GUTTENBERG
WEST NEW YORK
SEWAGE TREATMENT
PLANT
WEST NEW YORK
27" Ø
1
HUDSON
SCALE IN FEET
0
1000
2000
3000

FIG. 17 WEST NEW YORK HUDSON CO. N.J. DRAINAGE BASIN AND REGULATOR LOCATIONS

SECTION X

NEWTOWN CREEK SEWAGE TREATMENT PLANT

DRAINAGE BASIN,

BROOKLYN, MANHATTAN, QUEENS, N.Y.

The Newtown Creek Treatment Plant services three drainage areas: Brooklyn, Manhattan, and Queens. The Brooklyn drainage area contains eighteen regulators -- ten with hydraulic float systems, two with mechanical float systems, and six with manual operated sluice gates. The Manhattan drainage area contains forty regulators -- all with hydraulic float systems. The Queens drainage area contains one regulator and utilizes a hydraulic float system for flow control.

Field inspections were made only on those regulators located in Brooklyn and Queens. The results of these inspections showed that two of the nineteen regulators were inoperable. In a follow-up telephone conversation with the Acting Chief of the Division of Plant Operations for New York City, one regulator has been repaired and repairs on the other are in progress.

The Manhattan regulator chambers were not inspected since they were purposely flooded to protect equipment while construction proceeds on the Manhattan pump station. This pump station, which will be operational in the Spring of 1973, will pump sewage fron the Manhattan drainage area under the East River to Newtown Creek Treatment Plant in Brooklyn. The regulator maintenance crews for the Newtown Creek system consist of personnel from the New York City Department of Public Works, Bureau of Sewers. They utilize a specially equipped truck to aid personnel in the inspection and the maintenance of the regulators.

Additional information regarding the regulators within this drainage area is found in Tables 5-B, 5-Q, and 5-M and Figures 18 through 26.

TABLE 5 (B) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
B-1	Johnson Avenue East of Morgan Avenue	TWO 4'-0" x 3'-0" Sluice Gates with Hydraulic Float Systems	3,143	N/A	N/A	N/A	80	0	15	5	N/A	N/A
B-1 A	Johnson Avenue East of Morgan Avenue	Diversion and Tide Gate Chamber	(Combined Data for B-1 & B-1A)									
B-2	Metropolitan & Onderdonk Avenues	12" x 12" Sluice Gate with Hydraulic Float System	116	N/A	N/A	N/A	90	0	10	0	N/A	N/A
B-3	Taylor Street & Kent Avenue	Diversion & Tide Gate Chambers	498	N/A	N/A	N/A	65	0	25	10	N/A	N/A
B-4	Kent Avenue & Taylor Street	4'-0" x 3'-0" Sluice Gate with Hydraulic Float System	(Combined Data for B-3 & B-4)									
B-5	Kent Avenue & Division Street	4'-0" x 3'-0" Sluice Gate with Hydraulic Float System	2,679	250,000	N/A	N/A	75	0	15	10	N/A	N/A
B-5 A	South 8th St. & Kent Avenue	12" x 12" Sluice Gate with Hydraulic Float System	273	N/A	N/A	N/A	30	0	70	0	N/A	N/A
B-6	Kent Avenue & South 5th St.	3'-0" x 2'-0" Sluice Gate with Hydraulic System	273	55,000	N/A	N/A	70	0	25	5	N/A	N/A

TABLE 5 (B) - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS Interceptor Line Upstream	 Downstream	 Trunk Line	 By-Pass Line	 Outfall	Receiving Waterway	INSPECTION DATA Date	 Operable (Yes or No)	 Comments	Figure No. for Location of Regulator
B-1	---	6'-9" x 6'-9" BR INT To 90" ø	---	---	---	---	10-27-71	Yes	- - -	19
B-1 A	---	---	TWO 216" RC	TWO 216" RC	TWO 216" RC	English Kill	10-27-71	Yes	- - -	19
B-2	---	18" ø VP BR INT To REG B-1	36" ø RC	36" ø RC	36" ø RC	Newtown Creek	10-27-71	No	Water supply valve to hydraulic equipment out of order. Regulator gate held open with stick.	19
B-3	---	6'-0" x 4'-6" BR INT To REG B-4	216" ø RC	216" ø RC	216" ø RC	East River	---	---	- - -	18
B-4	6'-0" x 4'-6" BR INT FROM REG B-3	6'-0" x 5'-0"	---	---	---	---	10-4-71	Yes	No inflow through tide gates visible.	18
B-5	6'-0" ø	60" BR INT To 7'-0" x 6'-6"	108" ø BRICK	108" ø BRICK	108" ø BRICK	East River	10-4-71	Yes	Good condition. Slight inflow from two tide gates.	18
B-5 A	7'-0" x 6'-6"	12" ø BR INT To 7'-0" x 6'-6"	36" ø VP	36" ø VP	36" ø VP	East River	10-4-71	Yes	Good condition.	18
B-6	7'-0" x 6'-6"	42" ø BR INT To 7'-6" x 7'-6"	144" ø BRICK	144" ø BRICK	144" ø BRICK	East River	10-4-71	Yes	Visible accumulation of grease in float chamber. Slight leak from tide gates.	18

TABLE 5 (B) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
B-6 A	East River & Grand Street	10" x 10" Manual Operated Sluice Gate	149	800	N/A	N/A	20	0	80	0	N/A	N/A
B-7	Metropolitan Avenue & East River	18" x 18" Sluice Gate with Hydraulic Float System	132	30,000	N/A	N/A	30	35	30	5	N/A	N/A
B-8	North 5th St. & Kent Avenue	12" x 12" Sluice Gate with Hydraulic Float System	62	6,000	N/A	N/A	0	0	100	0	N/A	N/A
B-9	North 12th St. & Kent Avenue	3'-0" x 2'-0" Sluice Gate with Hydraulic Float System	880	60,000	N/A	N/A	40	0	60	0	N/A	N/A
B-10	Quay & West Streets	7-1/2" x 15-3/8" Hinged Gate with Mechanical Float System	62	9,000	N/A	N/A	20	20	60	0	N/A	N/A
B-11	Foot of Greenpoint Avenue	10" x 10" Manually Operated Sluice Gate	25	1,200	N/A	N/A	0	0	100	0	N/A	N/A
B-12	Huron & West Streets	16" x 21-5/8" Hinged Gate with Mechanical Float System	477	15,000	N/A	N/A	30	0	70	0	N/A	N/A
B-13	Green & West Streets	10" x 10" Manually Operated Sluice Gate	15	800	N/A	N/A	0	0	100	0	N/A	N/A

TABLE 5 (B) - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
B-6 A	7'-6" x 7'-6"	12" ϕ BR INT To 7'-6" x 7'-6"	12" ϕ	12" ϕ	12" ϕ	East River	10-4-71	Yes	Slight leak around tide gate (not seated properly).	18
B-7	7'-6" x 7'-6"	24" ϕ BR INT To 7'-6" x 7'-6"	60" ϕ BRICK	60" ϕ BRICK	60" ϕ BRICK	East River	10-4-71	Yes	Slight leak around tide gate (not seated properly).	18
B-8	7'-6" x 7'-6"	18" ϕ BR INT To 7'-6" x 7'-6"	45" x 36" BRICK	45" x 36" BRICK	45" x 36" BRICK	East River	10-4-71	Yes	Gate blocked by heavy grease accumulation -- corrected by crew.	18
B-9	7'-6" x 7'-6"	8'-0" x 7'-6"	TWIN 11'-2" x 8'-0" RC	TWIN 11'-2" x 8'-0" RC	TWIN 11'-2" x 8'-0" RC	East River	10-4-71	Yes	Slight flow from bottom seal of all four tide gates.	18
B-10	8'-0" x 7'-6"	18" ϕ BR INT To 8'-0" x 7'-6"	66' ϕ RC	66" ϕ RC	66" ϕ RC	East River	10-5-71	Yes	Some grit in float chamber. Medium seepage from tide gate bottom seal.	18
B-11	36" ϕ	12" ϕ BR INT To 36" ϕ	24" ϕ	24" ϕ	24" ϕ	East River	10-5-71	Yes	Stoppage in line in diversion chamber corrected by crew.	18
B-12	24" ϕ	30" ϕ BR INT To 36" ϕ	84" ϕ BRICK	84" ϕ BRICK	84" ϕ BRICK	East River	10-5-71	Yes	One tide gate leaking slightly.	18
B 13	24" ϕ	12" ϕ BR INT To 24" ϕ	30" x 24" EGG SHAPED BRICK	30" x 24" EGG SHAPED BRICK	30" x 24" EGG SHAPED BRICK	East River	10-5-71	Yes	A 2 x 4 piece of wood stuck in tide gate -- cleared by crew. Slight leak from tide gate.	18

TABLE 5 (B) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
B-14	West & Freeman Streets	10" x 10" Manually Operated Sluice Gate	31	1,300	N/A	N/A	30	0	70	0	N/A	N/A
B-15	Dupont & West Streets	10" x 10" Manually Operated Sluice Gate	19	400	N/A	N/A	0	0	70	30	N/A	N/A
B-16	Clay & Commercial Streets	10" x 10" Manually Operated Sluice Gate	31	1,800	N/A	N/A	20	0	80	0	N/A	N/A
B-17	Oakland & Ash Streets	12" x 12" Sluice Gate with Hydraulic Float System	25	4,000	N/A	N/A	0	0	100	0	N/A	N/A

NOTES FOR TABLE 5 (B):

Regulator Data - taken from regulator detail sheets (1966) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Drainage Area Data - boundaries determined from Existing Sewer Line Map of Brooklyn. Acreage calculated from the layout of the drainage area boundaries.

Population Data - from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (for the year 1970).

Land Use Data - estimated from Land Use Policy Maps in Plan for New York City, A Proposal - 1969, Volume 3-Brooklyn prepared by the New York City Planning Commission.

Hydraulic Data - not available.

TABLE 5 (B) - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS: Interceptor Line: Upstream	Downstream	Trunk Line	By-Pass Line	Outfall	Receiving Waterway	INSPECTION DATA: Date	Operable (Yes or No)	Comments	Figure No. for Location of Regulator
B-14	24" ø	24" ø	TWO 12" ø VP & 18" ø	31" x 20" EGG SHAPED BRICK	31" x 20" EGG SHAPED BRICK	East River	10-5-71	Yes	Blockage in line to interceptor -- cleared by crew.	18
B-15	24" ø	12" ø BR INT To 24" ø	12" ø	12" ø	12" ø	East River	10-27-71	---	Dry hole - regulator has never been used.	18
B-16	18" ø	12" ø CI BR INT To 24" ø	12" ø & 18" ø	24" ø	24" ø	East River	10-27-71	---	Temporarily no-access to manhole (automobile parked over manhole). Tide gate closed and in good condition.	18
B-17	---	18" ø	42" ø & 5'-0" x 4'-6"	6'-3" x 4'-6"	6'-3" x 4'-6"	East River	10-27-71	Yes	Tide gate open slightly at bottom.	18

NOTES FOR TABLE 5 (B) (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Existing Sewer Line Map of Brooklyn.

Inspection Data - according to telephone conversation on June 2, 1972 with Acting Chief of the Division of Plant Operations, New York Environmental Protection Administration, Division of Water Resources and Water Pollution Control, repairs are being made on regulator B-2.

TABLE 5 (Q) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN

QUEENS, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
Q-1	Rust Street & 56th Drive	24" x 24" Sluice Gate with Hydraulic Float System	2,549	N/A	N/A	N/A	75	10	10	5	N/A	N/A

NOTES FOR TABLE 5 (Q):

Regulator Data - taken from regulator detail sheets (1956) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Drainage Area Data - boundaries determined from Existing Sewer Line Map of Queens. Acreage calculated from the layout of the drainage area boundaries.

Population Data - not available.

Land Use Data - estimated from Land Use Policy Maps in Plan for New York City, A Proposal-1969, Volume 5-Queens prepared by the New York City Planning Commission.

Hydraulic Data - not available.

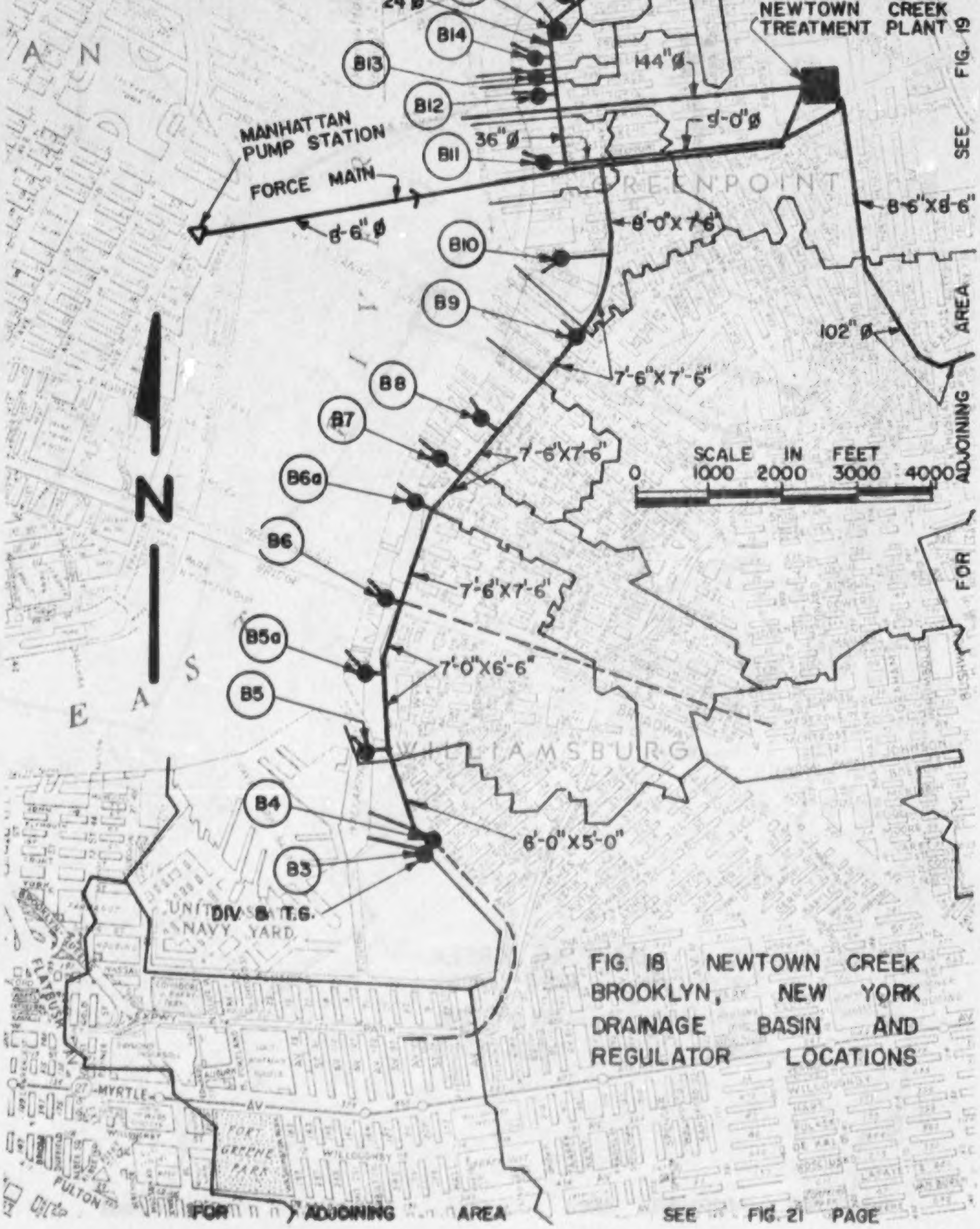
TABLE 5 (Q) - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
Q-1	---	3'-9" ∅	TWO 8'-0" x 7'-0" RC & 7'-6" x 7'-0" RC & 7'-0" x 5'-6" RC	TWO 8'-0" x 7'-0"	TWO 8'-0" x 7'-0"	Maspeth Creek	10-27-71	No	Regulator in open position due to debris & grease in float chamber.	19

NOTES FOR TABLE 5 (Q) (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Existing Sewer Line Map of Queens.

Inspection Date - according to telephone conversation on June 2, 1972 with Acting Chief of the Division of Plant Operations, New York Environmental Protection Administration, Division of Water Resources and Water Pollution Control, regulator Q-1 has been placed into operable condition.



QUEENS MIDTOWN TUNNEL
B17
18"ø
B16
B15
24"ø
B14
B13
B12
B11
36"ø
144"ø
9'-0"ø
NEWTOWN CREEK TREATMENT PLANT
MANHATTAN PUMP STATION
FORCE MAIN
8'-6"ø
GREENPOINT
8'-6"X8'-6"
8'-0"X7'-6"
B10
B9
102"ø
7'-6"X7'-6"
B8
B7
7'-6"X7'-6"
SCALE IN FEET
0 1000 2000 3000 4000
B6a
N
B6
7'-6"X7'-6"
B5a
7'-0"X6'-6"
B5
E A S
WILLIAMSBURG
B4
6'-0"X5'-0"
B3
DIV. B T.G.
UNITED STATES NAVY YARD
MYRTLE AV
FORT GREENE PARK
FULTON
FLATBUSH
SEE FIG. 19 PAGE FOR ADJOINING AREA
FOR ADJOINING AREA SEE FIG. 21 PAGE

FIG. 18 NEWTOWN CREEK BROOKLYN, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS

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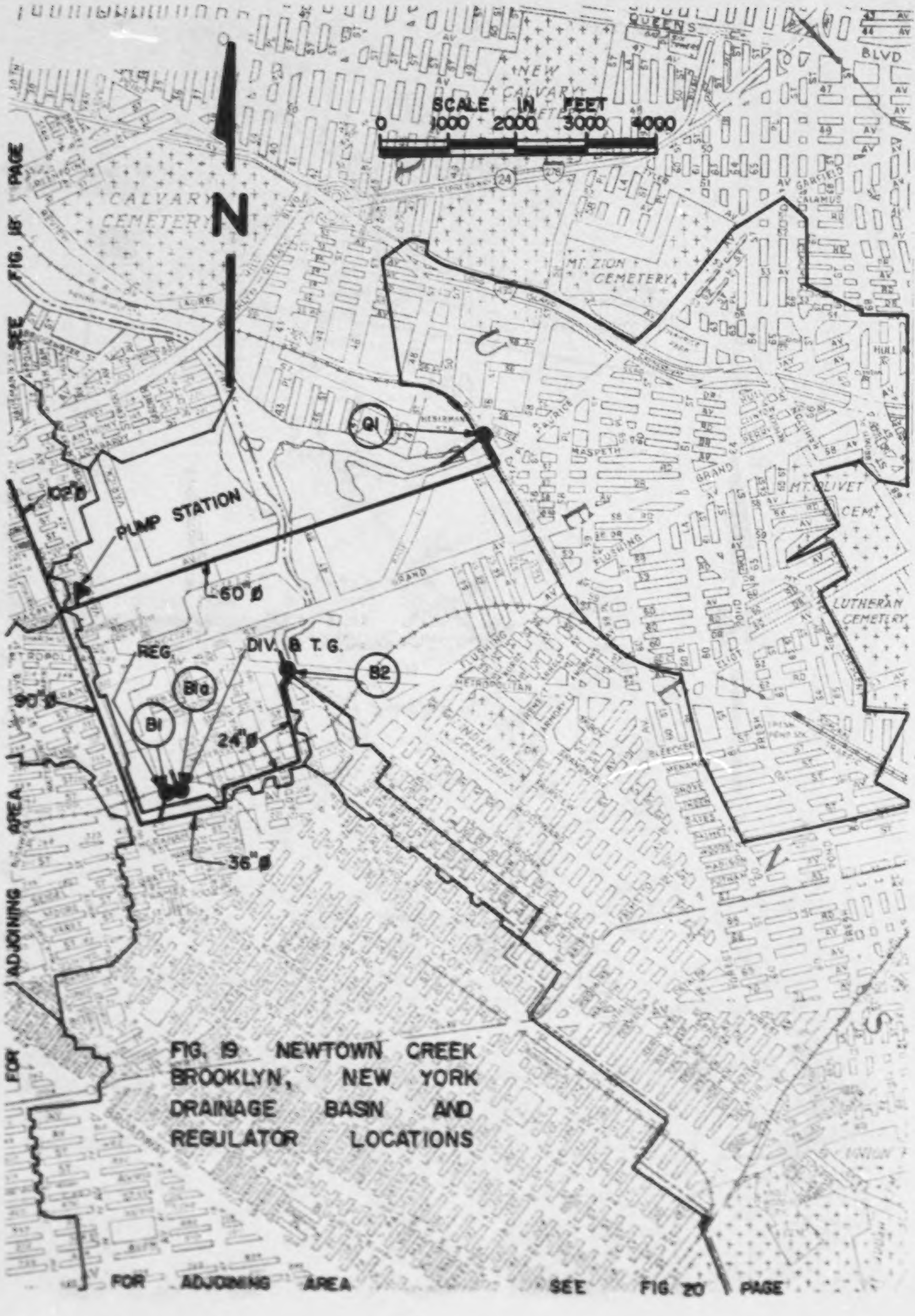

N
SCALE IN FEET
0 1000 2000 3000 4000
QUEENS BLVD
CALVARY CEMETERY
NEW CALVARY CEMETERY
MT. ZION CEMETERY
MT. OLIVET CEM.
LUTHERAN CEMETERY
LINDEN HILL CEMETERY
Q1
PUMP STATION
102"Ø
60"Ø
REG.
DIV. & T.G.
B2
B1a
B1
24"Ø
90"Ø
36"Ø
SEE FIG. 18 PAGE
FOR ADJOINING AREA
FOR ADJOINING AREA SEE FIG. 20 PAGE

FIG. 19 NEWTOWN CREEK BROOKLYN, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS

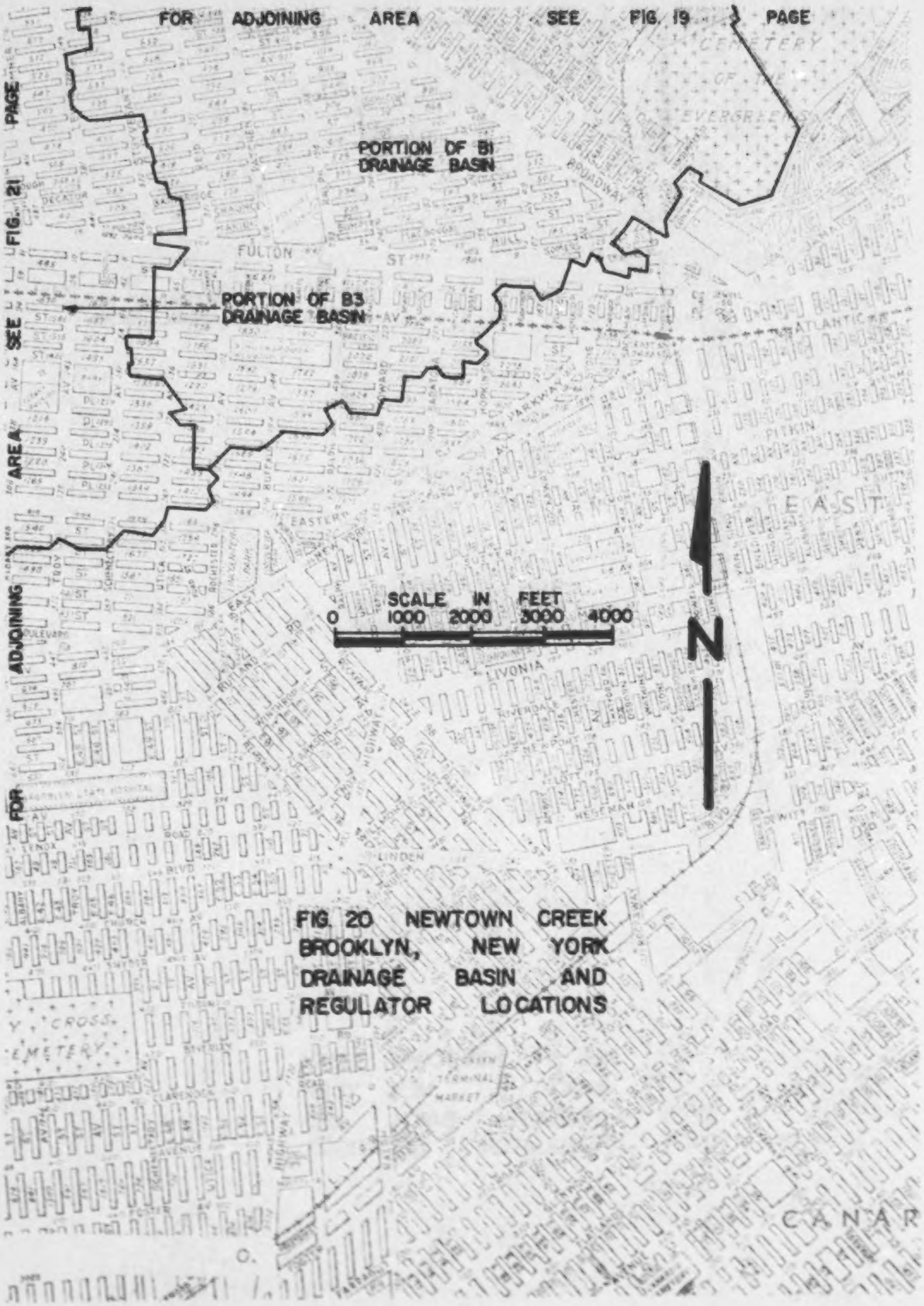
FOR ADJOINING AREA SEE FIG. 19 PAGE
FOR ADJOINING AREA SEE FIG. 21 PAGE
PORTION OF B1 DRAINAGE BASIN
PORTION OF B3 DRAINAGE BASIN
CEMETERY OF THE EVERGREENS
BROADWAY
FULTON ST
ATLANTIC
PITKIN
EAST
LIVONIA
LINDEN
SCALE IN FEET
0
1000
2000
3000
4000
N
CANAR

FIG. 20 NEWTOWN CREEK BROOKLYN, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS

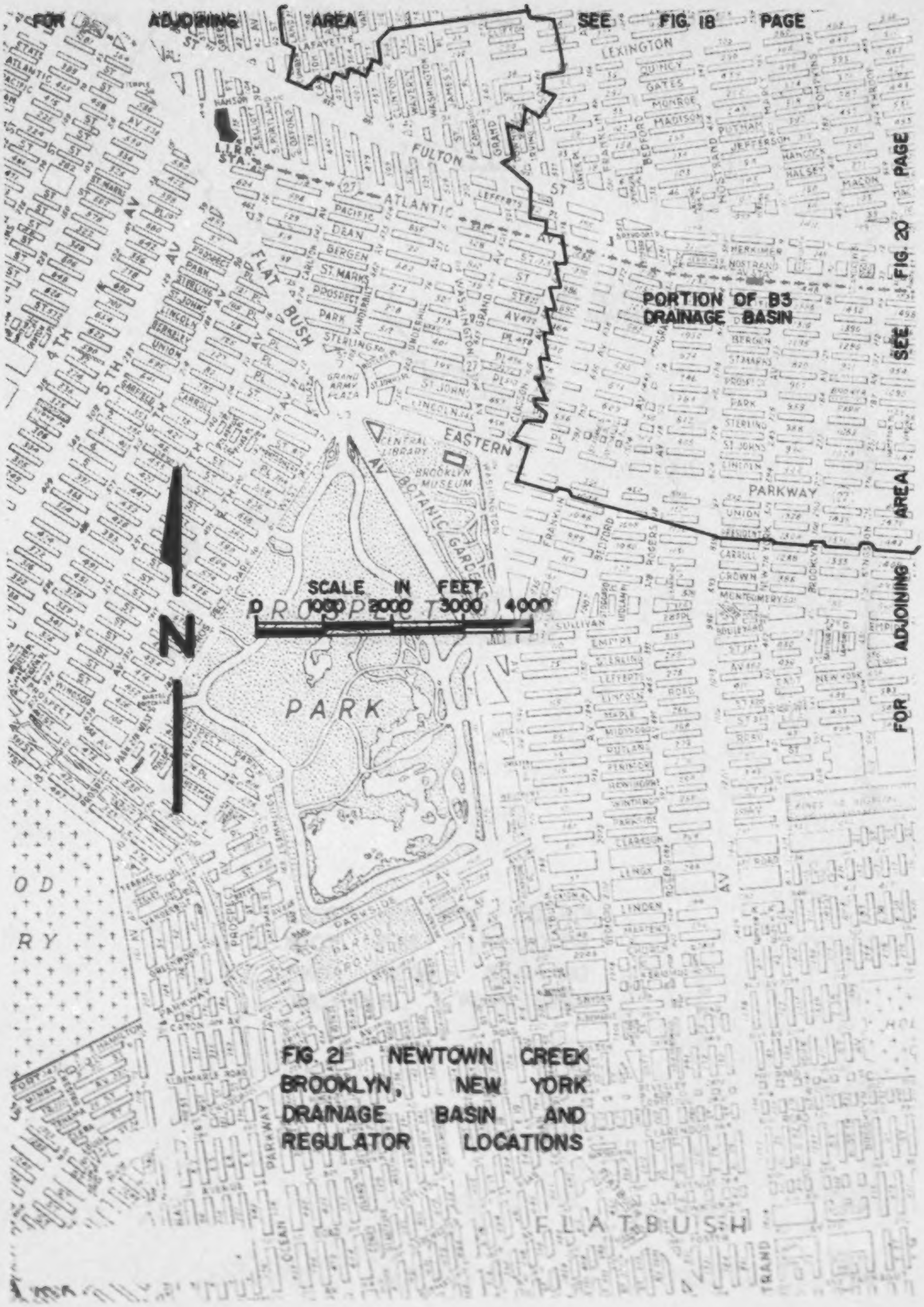
FOR ADJOINING AREA SEE FIG. 18 PAGE
SEE FIG. 20 PAGE
FOR ADJOINING AREA
PORTION OF B3 DRAINAGE BASIN
SCALE IN FEET
0
1000
2000
3000
4000
N
PROSPECT PARK
FLATBUSH
L.I.R.R. STA.
FULTON
ATLANTIC
LAFAYETTE
LEXINGTON
QUINCY
GATES
MONROE
MADISON
PUTNAM
JEFFERSON
HANCOCK
HALSEY
MACON
PACIFIC
DEAN
BERGEN
ST. MARKS
PROSPECT
PARK
STERLING
ST. JOHNS
LINCOLN
EASTERN
PARKWAY
UNION
CARROLL
CROWN
MONTGOMERY
HERKIMER
NOSTRAND
FLAT BUSH AV
4TH AV
5TH AV
GRAND ARMY PLAZA
CENTRAL LIBRARY
BROOKLYN MUSEUM
BOTANIC GARDENS
SULLIVAN
EMPIRE
LEFFERTS
LINDEN
PARADE GROUNDS
PARKSIDE
CATON
GREENWOOD
OCEAN PARKWAY

FIG. 21 NEWTOWN CREEK BROOKLYN, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-1	West Street & Clarkson Street	2'-6" x 1'-6" Sluice Gate with Hydraulic Float System	450	53,200	N/A	N/A	70	10	15	5	23.83	N/A
M-2	West Street & Clarkson Street	30" x 24" Sluice Gate with Hydraulic Float System	246	11,400	N/A	N/A	0	70	30	0	8.82	N/A
M-3	Vestry Street & West Street	18" x 12" Sluice Gate with Hydraulic System	54	200	N/A	N/A	0	0	100	0	1.26	N/A
M-4	West Street & Duane Street	24" x 18" Sluice Gate with Hydraulic Float System	124	1,600	N/A	N/A	0	99	0	1	4.00	N/A
M-5	West Street & Vesey Street	14" x 14" Sluice Gate with Hydraulic Float System	47	300	N/A	N/A	0	99	0	1	2.20	N/A
M-6	West Street & Albany Street	12" x 12" Sluice Gate with Hydraulic Float System	16	200	N/A	N/A	0	100	0	0	0.44	N/A
M-7	West Street & Rector Street	18" x 12" Sluice Gate with Hydraulic F.oat System	32	600	N/A	N/A	0	100	0	0	1.35	N/A

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TABLE 5 (M) - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
M-1	---	36" ø PRCP BR INT To 54" ø FTRC	6'-3" x 12' 0" FTRC	6'-3" x 12'-0" FTRC	6'-3" x 12'-0" FTRC	Hudson River	1-18-72	Yes	---	22
M-2	54" ø PRCP	36" ø PRCP BR INT To 66" ø PRCP	6'-0" x 16'-0" FTRC	6'-0" x 16'-0" FTRC	6'-0" x 16'-0" FTRC	Hudson River	1-18-72	---	Chamber flooded for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	23
M-3	66" ø	24" ø RC BR INT To 72" ø	5'-0" x 3'-6" ELLIP BRICK	5'-0" x 3'-6" ELLIP BRICK	5'-0" x 3'-6" ELLIP BRICK	Hudson River	1-18-72	---	Chamber flooded for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	23
M-4	72" ø	30" ø PRCP BR INT To 78" ø	4'-1 1/2" x 8'-10" RC	4'-1 1/2" x 8'-10" RC	4'-1 1/2" x 8'-10" RC	Hudson River	1-18-72	---	Chamber flooded for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	23
M-5	78" ø	24" ø PRCP BR INT To 78" ø	5'-0" x 5'-0" FTRC	4'-0" ø BRICK	4'-0" ø BRICK	Hudson River	1-18-72	---	Chamber flooded for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	23
M-6	78" ø	78" ø	4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	Hudson River	1-18-72	---	Chamber flooded for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	23
M-7	78" ø	78" ø	5'-0" x 6'-0" RC	5'-0" x 6'-0" RC	5'-0" x 4'-0" FTRC	Hudson River	1-18-72	---	Chamber flooded for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	23

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-8	West Street & Morris Street	12" x 12" Sluice Gate with Hydraulic Float System	28	400	N/A	N/A	0	85	0	15	1.25	N/A
M-9	West Street & Battery Place	12" x 12" Sluice Gate with Hydraulic Float System	(Combined Data for Regulators M-8 & M-9)									
M-10	South & Broad Streets	24" x 24" Sluice Gate with Hydraulic Float System	96	3,000	145,100	96,800	0	99	0	1	9.912	N/A
M-11	South St. & Coenties Slip West	18" x 12" Sluice Gate with Hydraulic Float System	20	700	55,100	36,800	0	100	0	0	3.620	N/A
M-12	South Street & Old Slip	Tide Gate	(Combined Data for Regulators M-11 & M-12)									
M-13	South & Fletcher Streets	18" x 18" Sluice Gate with Hydraulic Float System	53	500	98,100	65,300	0	100	0	0	6.222	N/A
M-14	South & John Streets	Tide Gate	(Combined Data for Regulators M-13, M-14, M-15 & M-16)									

TABLE 5 (M) - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS Interceptor Line Upstream	Interceptor Line Downstream	Trunk Line	By-Pass Line	Outfall	Receiving Waterway	INSPECTION DATA Date	Operable (Yes or No)	Comments	Figure No. for Location of Regulator
M-8	78" ø	78" ø	4'-0" ø RC	4'-0" ø RC	4'-0" ø RC	Hudson River	---	- -	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	23
M-9	78" ø	18" ø BR INT To 78" ø	5'-0" x 4'-0" FTRC	5'-0" x 4'-0" FTRC	5'-0" x 4'-0" FTRC	Hudson River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	23
M-10	5-'0" x 8'-0"	30" ø BR INT To 5'-0" x 8'-0"	5'-0" x 7'-6" FTRC	5'-0" x 7'-6" FTRC	5'-0" x 7'-6" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	24
M-11	5'-0" x 8'-0"	21" ø BR INT To 5'-0" x 8'-0"	4'-0" ø BRICK	4'-6" x 3'-8" WOOD	4'-6" x 3'-8" WOOD	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	24
M-12	---	---	4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	East River	---	---	- - -	-
M-13	5'-0" x 8'-0"	27" ø PRCP BR INT To 6'-0" x 8'-0"	4'-0" ø	4'-0" ø	4'-0" ø	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	24
M-14	---	---	4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	East River	---	---	- - -	-

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-15	South & Fulton Streets	Tide Gate	(Combined Data for Regulators M-13, M-14, M-15 & M-16)									
M-16	South Street & Peck Slip	Tide Gate										
M-17	South St. & Robert F.Wagner, Senior Place	24" x 12" Sluice Gate with Hydraulic Float System	93	8,300	33,500	22,300	35	60	0	5	4.624	N/A
M-18	South St. & Catherine Slip	Tide Gate Chamber	(Combined Data for Regulators M-17 & M-18)									
M-19	South St. & Catherine Slip	24" x 24" Sluice Gate with Hydraulic Float System	166	31,100	26,300	17,600	20	65	15	0	11.245	N/A
M-20	South St. & Market Slip	18" x 12" Sluice Gate with Hydraulic Float System	38	9,900	4,200	2,800	60	35	0	5	3.328	N/A
M-21	South St. & Jefferson St.	24" x 18" Sluice Gate with Hydraulic Float System	139	26,000	7,000	4,700	70	28	0	2	8,482	N/A

TABLE 5 (M)-(Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
M-15	---	---	4'-0" x 4'-0" FTRC	4'-0" x 4'-0" FTRC	4'-0" x 4'-0" FTRC	East River	---	---	- - -	-
M-16	---	---	4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	East River	---	---	- - -	-
M-17	6'-0" x 8'-0"	24" ø PRCT BR INT To 6'-0" x 8'-0"	6'-0" SEMI-CIRC FTRC & 4'-0" x 4'-0" FTRC	6'-0" SEMI-CIRC FTRC	6'-0" SEMI-CIRC FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	24
M-18	---	---	5'-0" x 9'-0" FTRC	5'-0" x 9'-0" FTRC	5'-0" x 9'-0" FTRC	East River	---	---	- - -	-
M-19	6'-0" x 8'-0"	36" ø BR INT To 6'-0" x 8'-0"	4'-6" x 4'-0" FTRC	4'-6" x 4'-0" FTRC	4'-6" x 4'-0" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	24
M-20	7'-0" x 8'-0"	21" ø BR INT To 7'-0" x 8'-0"	4'-6" ø BRICK	4'-6" ø BRICK	4'-6" ø BRICK	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	24
M-21	7'-0" x 8'-0"	30" ø BR INT To 7'-0" x 8'-0"	4'-0"	4'-0" ø WOOD	4'-0" ø WOOD	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	24

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-22	South St. & Gouverneur Slip	Diversion & Tide Gate Chambers	14	N/A	N/A	N/A	80	20	0	0	N/A	N/A
M-23	South St. & Jackson St.	Diversion & Tide Gate Chambers	12	2,300	200	100	90	0	0	10	N/A	N/A
M-24	East River Park - East of Jackson Street	12" x 12" Sluice Gate with Hydraulic Float System	28	2,300	200	100	90	0	0	10	N/A	N/A
M-25	East River Park & Grand Street	Diversion & Tide Gate Chambers	48	1,600	100	100	80	20	0	0	0.975	N/A
M-26	East River Park & Grand Street	18" x 18" Sluice Gate with Hydraulic Float System	75	16,500	1,700	1,100	80	20	0	0	5.204	N/A
M-27	East River Park & Broome Street	Tide Gate	(Combined Data for M-26 & M-27)									
M-28	East River Park & Delancey Street	Tide Gate	(Combined Data for M-28 & M-29)									

TABLE 5 (M)-(Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
M-22	---	15" ø VP BR INT	TWO 4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	East River	---	---	- - -	24
M-23	---	15" ø VP BR INT	4'-0" x 3'-0" ELLIP & 15" ø VP	4'-0" x 3'-0" ELLIP	4'-0" x 3'-0" ELLIP	East River	---	---	- - -	24
M-24	9'-0" ø	21" ø PRCP BR INT To 9'-0" ø	---	---	---	---	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	24
M-25	---	12" ø VP BR INT	5'-0" x 4'-0" FTRC	5'-0" x 4'-0" FTRC	5'-0" x 4'-0" FTRC	East River	---	---	- - -	24
M-26	9'-0" ø	24" ø BR INT To 9'-0" ø	5'-6" x 2'-8" FTRC	5'-6" x 2'-8" FTRC	5'-6" x 2'-8" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-27	---	---	4'-0" x 4'-0" FTRC	4'-0" x 4'-0" FTRC	4'-0" x 4'-0" FTRC	East River	---	---	- - -	-
M-28	---	---	4'-0" x 4'-0"	4'-0" x 4'-0"	4'-0" x 4'-0"	East River	---	---	- - -	-

TABLE 5 ([illegible]) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-29	East River Park & Rivington St.	18" x 18" Sluice Gate with Hydraulic Float System	(Combined Data for M-28 & N-29)									
M-30	East River Park & Stanton Street	18" x 18" Sluice Gate with Hydraulic Float System	61	14,500	1,100	700	70	30		0	4.533	N/A
M-31	East River Park & E Houston St.	Tide Gate	(Combined Data for M-31 & N-32)									
M-32	East River Park & East 3rd St.	24" x 18" Sluice Gate with Hydraulic Float System	147	38,600	4,000	2,700	90	10	0	0	12.170	N/A
M-33	East River Park & East 6th St.	12" x 12" Sluice Gate with Hydraulic Float System	11	2,100	100	100	70	0	0	30	0.642	N/A
M-34	East River Park & East [illegible]th St.	12" x 12" Sluice Gate with Hydraulic Float System	17	4,000	100	100	85	0	5	10	1.216	N/A
M-35	East River Park & East [illegible]th St.	12" x 12" Sluice Gate with Hydraulic Float System	18	4,300	300	200	85	0	5	10	1.341	N/A

TABLE 5 (M)-(Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
M-29	42" ∅ BR INT	27" ∅ & 48" ∅ BR INTS	5'-0" x 5'-0" PRCP	5'-0" x 5'-0" PRCP	5'-0" x 5'-0" PRCP	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-30	33" ∅ BR INT	27" ∅ PRCP BR INT To 42" ∅ BR INT	5'-6" x 5'-0" FTRC	5'-6" x 5'-0" FTRC	5'-6" x 5'-0" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-31	---	---	4'-6" x 6'-0" FTRC	4'-6" x 6'-0" FTRC	4'-6" x 6'-0" FTRC	East River	---	---	- - -	-
M 32	---	33" ∅ PRCP BR INT	6'-0" x 6'-6" FTRC	6'-0" x 6'-6" FTRC	6'-0" x 6'-6" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-33	---	12" ∅	5"-6" x 4'-0" FTRC	5'-6" x 4'-0" FTRC	5'-6" x 4'-0" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-34	12" ∅ VP BR INT	15" ∅ VP BR INT To 18" ∅ VP BR INT	5'-0" x 6'-6" FTRC	5'-0" x 6'-6" FTRC	5'-0" x 6'-6" FTRC	East River	---	---	Chamber flooded (assumed) for protection of Hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-35	---	15" ∅ VP BR INT	5'-0" x 8'-9" FTRC	5'-0" x 8'-9" FTRC	5'-0" x 8'-9" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-36	East 14th St. & Franklin D. Roosevelt Drive	36" x 24" Sluice Gate with Hydraulic Float System	272	73,700	14,000	9,400	90	10	0	0	17.50	N/A
M-37	Marginal St. South of 20th Street	2'-0" x 2'-6" Sluice Gate with Hydraulic Float System	220	42,400	65,000	43,200	40	50	5	5	21.421	N/A
M-38	Marginal St. North of 20th Street	12" x 30" Sluice Gate with Hydraulic Float System	68	10,400	39,800	26,600	40	60	0	0	5.665	N/A
M-39	West of Franklin D. Roosevelt Drive & South of E. 25th St.	24" x 12" Sluice Gate with Hydraulic Float System	67	12,600	12,600	8,400	50	50	0	0	4.678	N/A
M-39 A	Franklin D. Roosevelt Drive & South of E. 25th St.	Diversion & Tide Gate Chambers	(Combined Data for M-39 & M-39A)									
M-40	Bellevue Hospital North of E. 25th St.	24" x 24" Sluice Gate with Hydraulic Float System	150	20,200	150,200	100,100	70	30	0	0	15.555	N/A
M-41	Franklin D. Roosevelt Drive & East 30th Street	12" x 12" Sluice Gate with Hydraulic Float System	37	4,900	4,200	2,800	100	0	0	0	1.761	N/A

TABLE 5 (M)-(Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
M-36	108" ø	48" ø BR INT To 108" ø	6'-0" x 9'-0" FTRC & 12" ø VP	6'-0" x 9'-0"	TWO 6'-0" x 9'-0" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-37	108" ø	42" ø BR INT To 108" ø	TWO 6'-0" x 3'-0" RC	6"-0" x 3'-0" & 6'-0" x 8'-0" RC	6'-0" x 3'-0" & 6'-0" x 8'-0" RC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-38	108" ø	30" ø BR INT To 108" ø	5'-0" x 4'-0" BRICK	5'-0" x 4'-0" BRICK	5'-0" x 4'-0" BRICK	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-39	---	24" ø BR INT To 48" ø BR INT	48" ø BRICK & 18" ø VP BR INT	48" ø BRICK	48" ø BRICK	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-39 A	---	18" ø VP BR INT To REGULATOR M-39	5'-0" x 2'-4" FTRC	5'-0" x 2'-4" FTRC	48" ø BRICK	East River	---	---	- - -	25
M-40	---	36" ø BR INT To 48" ø BR INT	TWO 6'-6" x 6'-0" FTRC & 5'-0" x 4'-0" FTRC	TWO 6'-6" x 6'-0" FTRC & 5'-0" x 4'-0" FTRC	TWO 6'-6" x 6'-0" FTRC & 5'-0" x 4'-0" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-41	96" ø	21' ø VP BR INT To 102" ø	4'-0" x 2''4" FTRC & 18" ø VP BR INT	4'-0" x 2'-4" FTRC	4'-0" x 2'-4" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-41 A	Franklin D. Roosevelt Drive & E. 29th St.	Diversion & Tide Gate Chambers	(Combined Data for M-41 & M-41A)									
M-42	East 33rd St. & First Avenue	24" x 18" Sluice Gate with Hydraulic Float System	150	25,100	47,000	31,300	70	0	30	0	10.00	N/A
M-43	Franklin D. Roosevelt Drive & E. 36th St.	24" x 12" Sluice Gate with Hydraulic Float System	55	6,700	14,200	9,500	85	15	0	0	3.73	N/A
M-43 A	Franklin D. Roosevelt Drive & E. 37th St.	Diversion & Tide Gate Chambers	(Combined Data for M-43, M-43A & M-43 B)									
M-43 B	Franklin D. Roosevelt Drive & E. 39th St.	Diversion & Tide Gate Chambers	(Combined Data for M-43, M-43A & M-43 B)									
M-44	E. 41st St. East of First Avenue	30" x 24" Sluice Gate with Hydraulic Float System	159	26,200	228,300	152,200	95	5	0	0	16.00	N/A

TABLE 5 (M)-(Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
M-41 A	---	18" ∅ VP BR INT To REGULATOR M-41	4'-0" ∅ BRICK	5'-6" x 4'-0" FTRC	5'-6" x 4'-0" FTRC	East River	---	---	- - -	25
M-42	96" ∅	3'-0" BR INT	TWO 6'-0" x 8'-0" FTRC	TWO 6'-0" x 8'-0" FTRC 96" ∅	TWO 6'-0" x 8'-0" FTRC 96" ∅	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-43	96" ∅	24" ∅ PRCP BR INT To 96" ∅	3'-6" x 2'-4" EGG SHAPED & 24" ∅ PRCP BR INT & 12" ∅ VP BR INT	3'-6" x 2'-4" EGG SHAPED	5'-6" x 2'-8" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	25
M-43 A	---	24" ∅ BR INT	3'-6" x 2'-4" BRICK & 24" ∅ BR INT FROM M-43 B	5'-6" x 2'-8" FTRC	5'-6" x 2'-8" FTRC	East River	---	---	- - -	25
M-43 B	---	24" ∅ BR INT	5'-0" ∅ BRICK	5'-0" ∅ BRICK	30" ∅ BRICK & 5'-0" x 4'-0" FTRC	East River	---	---	- - -	25
M-44	84" ∅	3'-6" x 4'-6" BR INT To 90" ∅	8'-0" x 8'-0" FTRC	8'-0" x 8'-0" FTRC	7'-0" x 9'-0" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	26

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-45	Franklin D. Roosevelt Drive & E. 41st St.	12" x 12" Sluice Gate with Hydraulic Float System	(Combined Data for M-44 & M-45)									
M-46	First Avenue & E. 46th St.	12" x 12" Sluice Gate with Hydraulic Float System	8	700	24,900	16,600	0	100	0	0	2.00	N/A
M-47	Franklin D. Roosevelt Drive & E. 49th St.	42" x 36" Sluice Gate with Hydraulic Float System	471	35,300	113,500	75,700	30	70	0	0	23.50	N/A
M-48	E. 54th St. & Sutton Place South	12" x 18" Sluice Gate with Hydraulic Float System	28	5,900	2,600	1,700	100	0	0	0	2.50	N/A
M-48 A	Franklin D. Roosevelt Drive & E. 53rd St.	Diversion & Tide Gate Chambers	5	700	400	300	100	0	0	0	0.40	N/A
M-49	E. 57th St. & Sutton Place South	12" x 12" Sluice Gate with Hydraulic Float System	13	3,000	1,200	800	90	10	0	0	1.25	N/A

TABLE 5 (M)-(Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
M-45	---	18" ø BR INT	4'-0" x 2'-8" FTRC & 8" ø FORCE MAIN	4'-0" x 2'-8" FTRC	4'-0" x 2'-8" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	26
M-46	84" ø	14" ø CI DROP LINE To 84" ø	6'-0" ø BRICK LINED	6'-0" ø BRICK LINED	6'-0" ø BRICK LINED	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	26
M-47	72" ø	6'-0" x 5'-0" BR INT To 84" ø	9'-0" x 8'-6" BRICK	9'-0" x 8'-6" BRICK	4'-6" ø WOOD	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	26
M-48	72" ø	21" ø BR INT To 72" ø	4'-0" x 2'-8" BRICK & 12" ø BR INT	4'-0" x 2'-8" BRICK	5'-0" x 4'-0" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	26
M-48 A	---	12" ø BR INT To REGULATOR M-48	3'-6" x 2'-4" EGG SHAPED BRICK & 12" ø	3'-6" x 2'-4" EGG SHAPED BRICK	4'-0" x 2'-4" FTRC	East River	---	---	- - -	26
M-49	72" ø	15" ø BR INT To 72" ø	3'-6" x 2'-4" EGG SHAPED BRICK	3'-6" x 2'-4" EGG SHAPED BRICK	3'-6" x 2'-4" EGG SHAPED BRICK	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	26

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
M-50	Franklin D. Roosevelt Drive & E. 61st St.	24" x 36" Sluice Gate with Hydraulic Float System	540	54,800	53,800	106,600	90	10	0	0	29.26	N/A
M-51	Franklin D. Roosevelt Drive & E. 70th St.	12" x 12" Sluice Gate with Hydraulic Float System	6	1,400	0	1,000	100	0	0	0	0.50	N/A
M-51 A	Franklin D. Roosevelt Drive & E. 70th St.	Diversion & Tide Gate Chambers	(Combined Data for M-51, M-51A & M-51B)									
M-51 B	Franklin D. Roosevelt Drive & E. 70th St.	Diversion & Tide Gate Chambers										
M-51 C	Franklin D. Roosevelt Drive & E. 70th St.	Diversion & Tide Gate Chambers	4	1,000	0	0	40	0	60	0	0.30	N/A

NOTES FOR TABLE 5 (M):

Regulator Data - taken from regulator detail sheets (1959) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

TABLE 5 (M)-(Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line Upstream	Interceptor Line Downstream	Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
M-50	24" ø PRCP	3'-6" x 6'-10" FTRC BR INT To 72" ø	TWO 5'-0" x 6'-6" FTRC & 15" ø VP BR INT	TWO 5'-0" x 6'-6" FTRC	TWO 5'-0" x 6'-6" FTRC	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	26
M-51	---	24" ø PRCP BR INT To 72" ø	3'-6" x 2'-4" EGG SHAPED BRICK & 24" ø BR INT	3'-6" x 2'-4" EGG SHAPED BRICK	3'-6" x 2'-4" EGG SHAPED BRICK	East River	---	---	Chamber flooded (assumed) for protection of hydraulic equipment. Regulator will be put into service when Manhattan Pump Station is completed.	26
M-51 A	---	24" ø BR INT To M-51	30" ø VP & 24" ø PRCP BR INT	30" ø VP	30" ø VP	East River	---	---	- - -	26
M-51 B	---	24" ø BR INT To M-51 A	3'-0" x 2'-0" BRICK & 15" ø BR INT	3'-0" x 2'-0" BRICK	3'-0" x 2'-0" BRICK	East River	---	---	- - -	26
M-51 C	---	15" ø BR INT To M-51 B	2'-0" x 3'-0" BRICK & 8" SANIT. & 8" ACID & 10" STORM	2'-0" x 3'-0" BRICK	2'-0" x 3'-0" BRICK	East River	---	---	- - -	26

NOTES FOR TABLE 5 (M) (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Existing Sewer Line Maps of New York.

TABLE 5 (M) - NEWTOWN CREEK TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		

NOTES FOR TABLE 5 (M) (CONTINUED):

Drainage Area Data - for regulators M-47, M-48, M-48A, M-49, M-50 & M-51: boundaries determined from Existing Sewer Line Map of New York City. Acreage calculated from the layout of the drainage area boundaries.
for the remaining regulators: taken from records supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Population Data - from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Land Use Data - estimated from Land Use Policy Maps in Plan for New York City, A Proposal - 1969, Volume 4-Manhattan prepared by the New York City Planning Commission.

Hydraulic Data - Trunk Line MDWF Data: supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control. For regulators M-1 through M-9 and M-37 through M-51, flows are estimated for the year 2000. For regulators M-10 through M-36, flows are estimated for the year 1970.
Interceptor Design Capacity Data: not available.

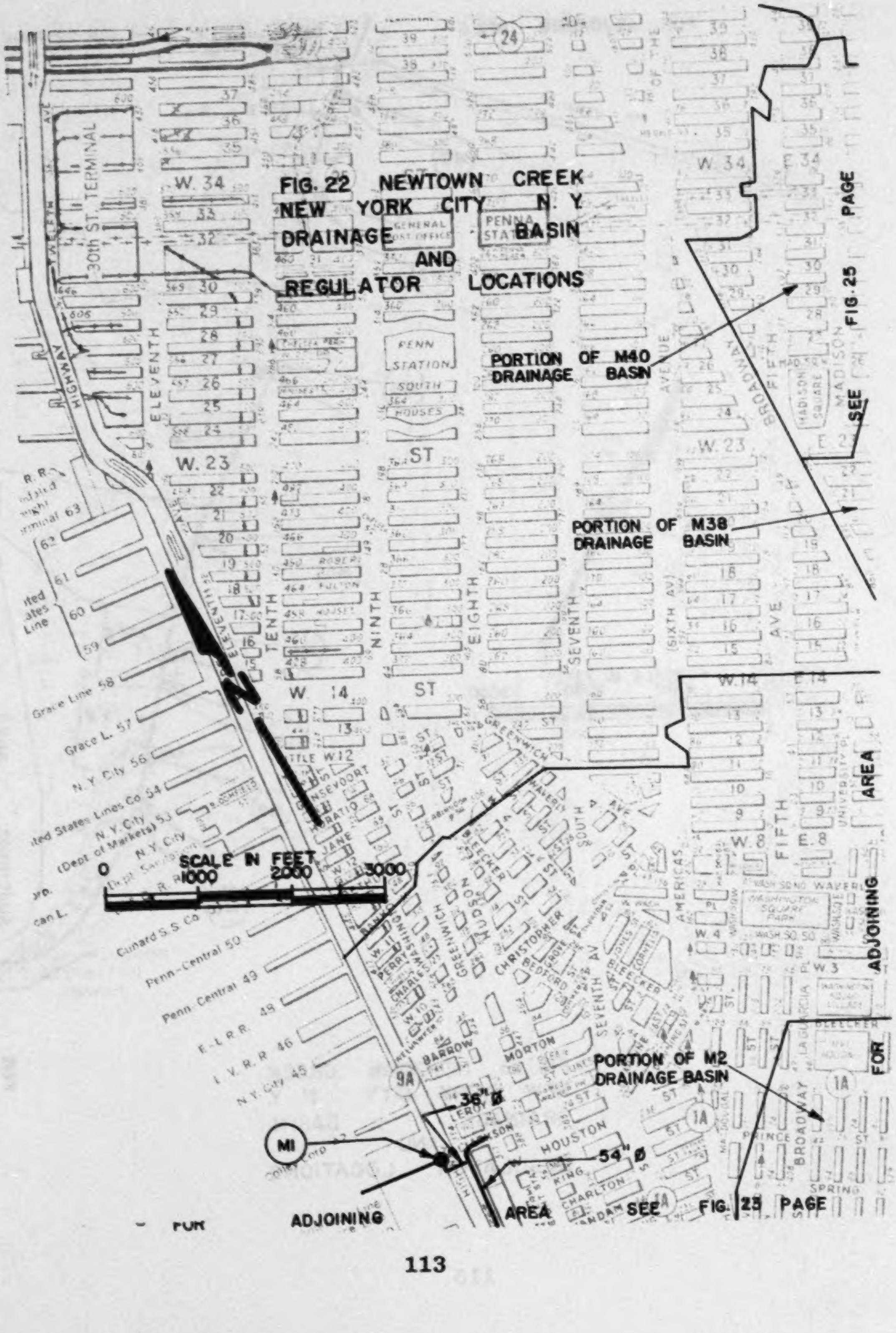

FIG. 22 NEWTOWN CREEK NEW YORK CITY N. Y. DRAINAGE BASIN AND REGULATOR LOCATIONS

PORTION OF M40 DRAINAGE BASIN
PORTION OF M38 DRAINAGE BASIN
PORTION OF M2 DRAINAGE BASIN
MI
36" Ø
54" Ø
SCALE IN FEET
0
1000
2000
3000
N
SEE FIG. 25 PAGE FOR ADJOINING AREA
SEE FIG. 23 PAGE FOR ADJOINING AREA
30th ST. TERMINAL
HIGHWAY
ELEVENTH
TENTH
NINTH
EIGHTH
SEVENTH
AVENUE
FIFTH
BROADWAY
MADISON
W. 34
W. 23
W. 14
ST
GENERAL POST OFFICE
PENNA STATION
PENN STATION SOUTH HOUSES
MADISON SQUARE
WASHINGTON SQUARE PARK
GREENWICH
HUDSON
BLEECKER
CHRISTOPHER
HOUSTON
PRINCE
SPRING
24
9A
1A

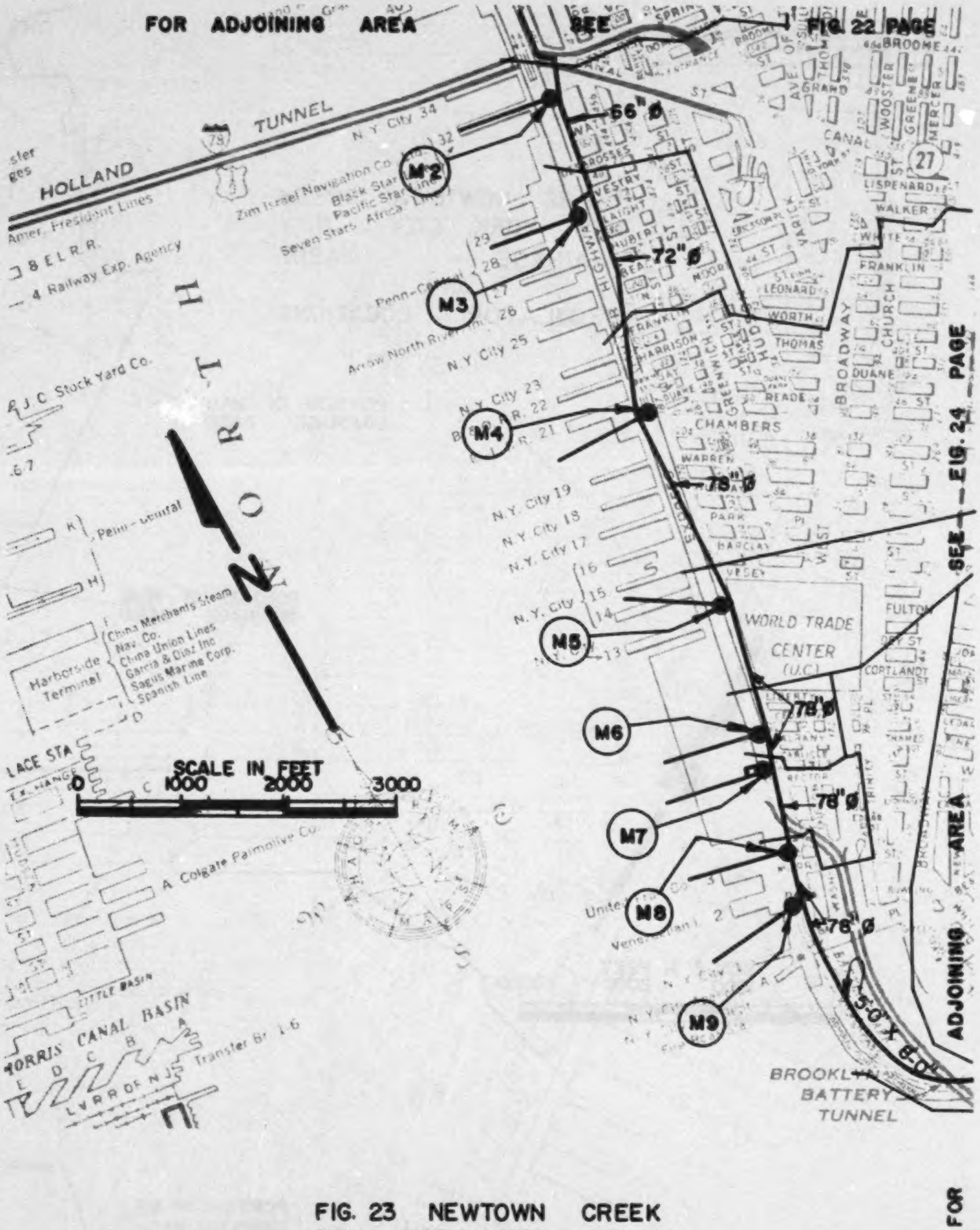
FOR ADJOINING AREA SEE FIG. 22 PAGE
SEE FIG. 24 PAGE
FOR ADJOINING AREA
HOLLAND TUNNEL
78
66"Ø
72"Ø
78"Ø
78"Ø
78"Ø
78"Ø
5'0" X 6'0"
M2
M3
M4
M5
M6
M7
M8
M9
N O R T H
N
SCALE IN FEET
0
1000
2000
3000
WORLD TRADE CENTER (U.C.)
BROOKLYN BATTERY TUNNEL
CHAMBERS
BROADWAY
CANAL
WEST
HIGHWAY
Harborside Terminal
MORRIS CANAL BASIN
27

FIG. 23 NEWTOWN CREEK
NEW YORK CITY N. Y.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

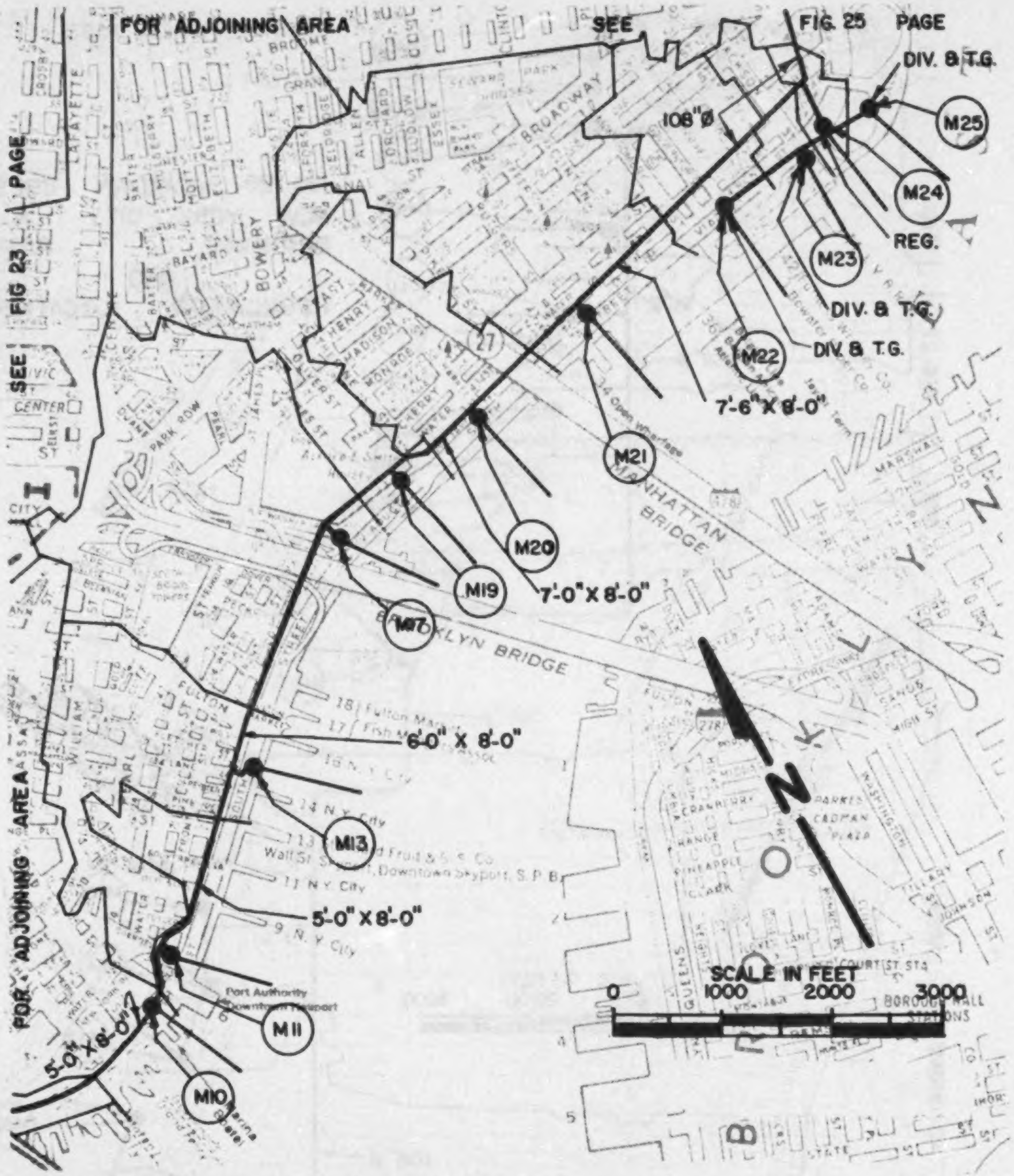
FOR ADJOINING AREA SEE FIG. 25 PAGE
SEE FIG 23 PAGE
FOR ADJOINING AREA
DIV. & T.G.
M25
108"Ø
M24
REG.
M23
DIV. & T.G.
DIV. & T.G.
M22
7'-6" X 8'-0"
M21
MANHATTAN BRIDGE
M20
M19
7'-0" X 8'-0"
M17
BROOKLYN BRIDGE
6'-0" X 8'-0"
M13
5'-0" X 8'-0"
Port Authority Downtown Heliport
M11
5'-0" X 8'-0"
M10
BROADWAY
BOWERY
PARK ROW
FULTON
CIVIC CENTER
N
SCALE IN FEET
0
1000
2000
3000

FIG. 24 NEWTOWN CREEK
NEW YORK CITY N. Y.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

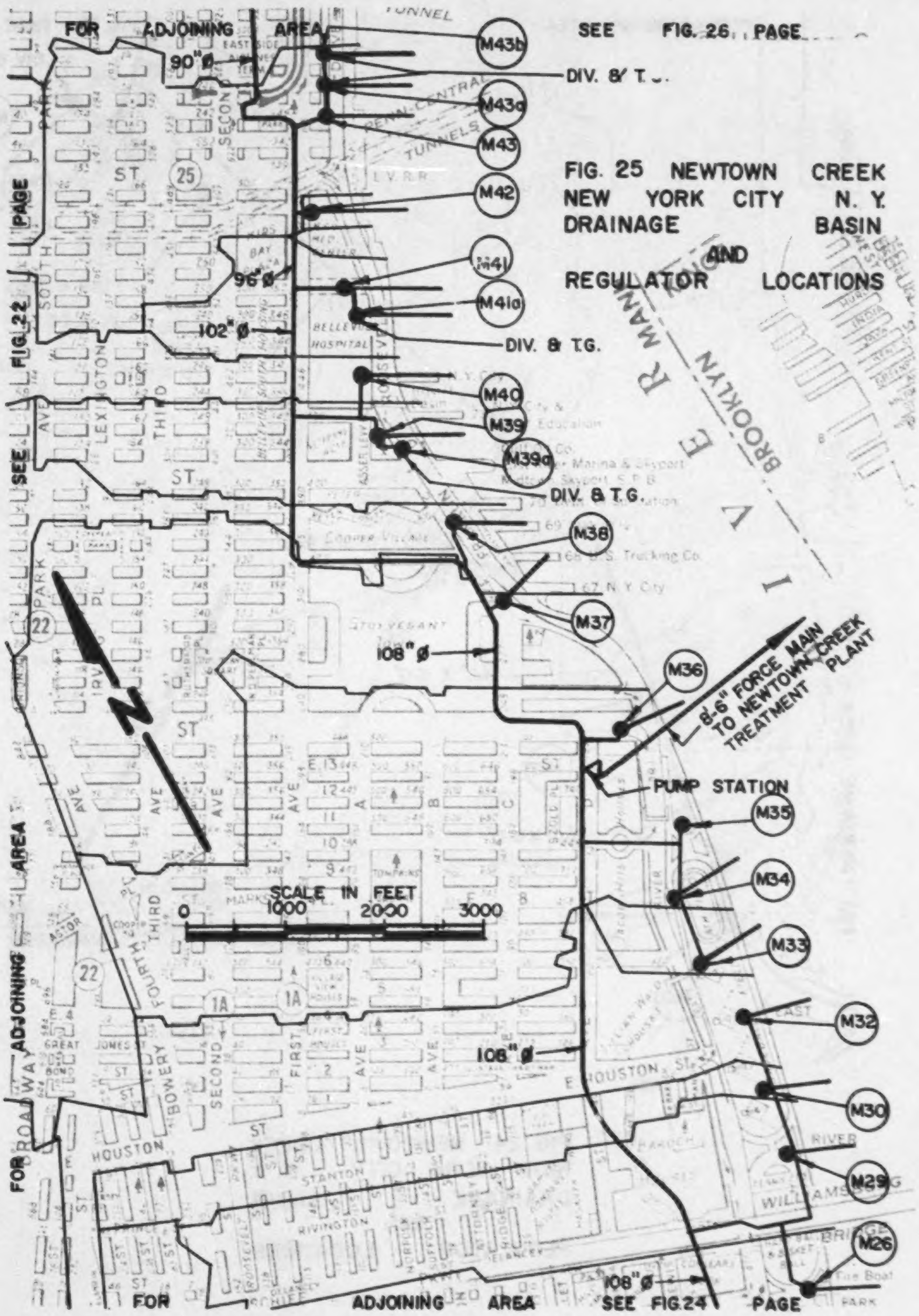
FOR ADJOINING AREA SEE FIG. 26, PAGE
90"Ø
M43b
DIV. & T.G.
M43a
M43
M42
96"Ø
M41
M41a
102"Ø
DIV. & T.G.
M40
M39
M39a
DIV. & T.G.
M38
M37
108"Ø
M36
8'-6" FORCE MAIN TO NEWTOWN CREEK TREATMENT PLANT
PUMP STATION
M35
M34
M33
M32
M30
M29
M26
SCALE IN FEET
0
1000
2000
3000
N
108"Ø
108"Ø
FOR ADJOINING AREA SEE FIG.24 PAGE
FOR ADJOINING AREA SEE FIG.22 PAGE
EAST RIVER
BROOKLYN
MANHATTAN
PENN-CENTRAL TUNNELS
BELLEVUE HOSPITAL
STUYVESANT
E. HOUSTON ST.
WILLIAMSBURG BRIDGE
BROADWAY
BOWERY
HOUSTON
STANTON
RIVINGTON
DELANCEY
LEXINGTON AVE
THIRD AVE
SECOND AVE
FIRST AVE
PARK AVE
IRVING PL
FOURTH AVE
ASTOR PL

FIG. 25 NEWTOWN CREEK NEW YORK CITY N.Y. DRAINAGE BASIN AND REGULATOR LOCATIONS

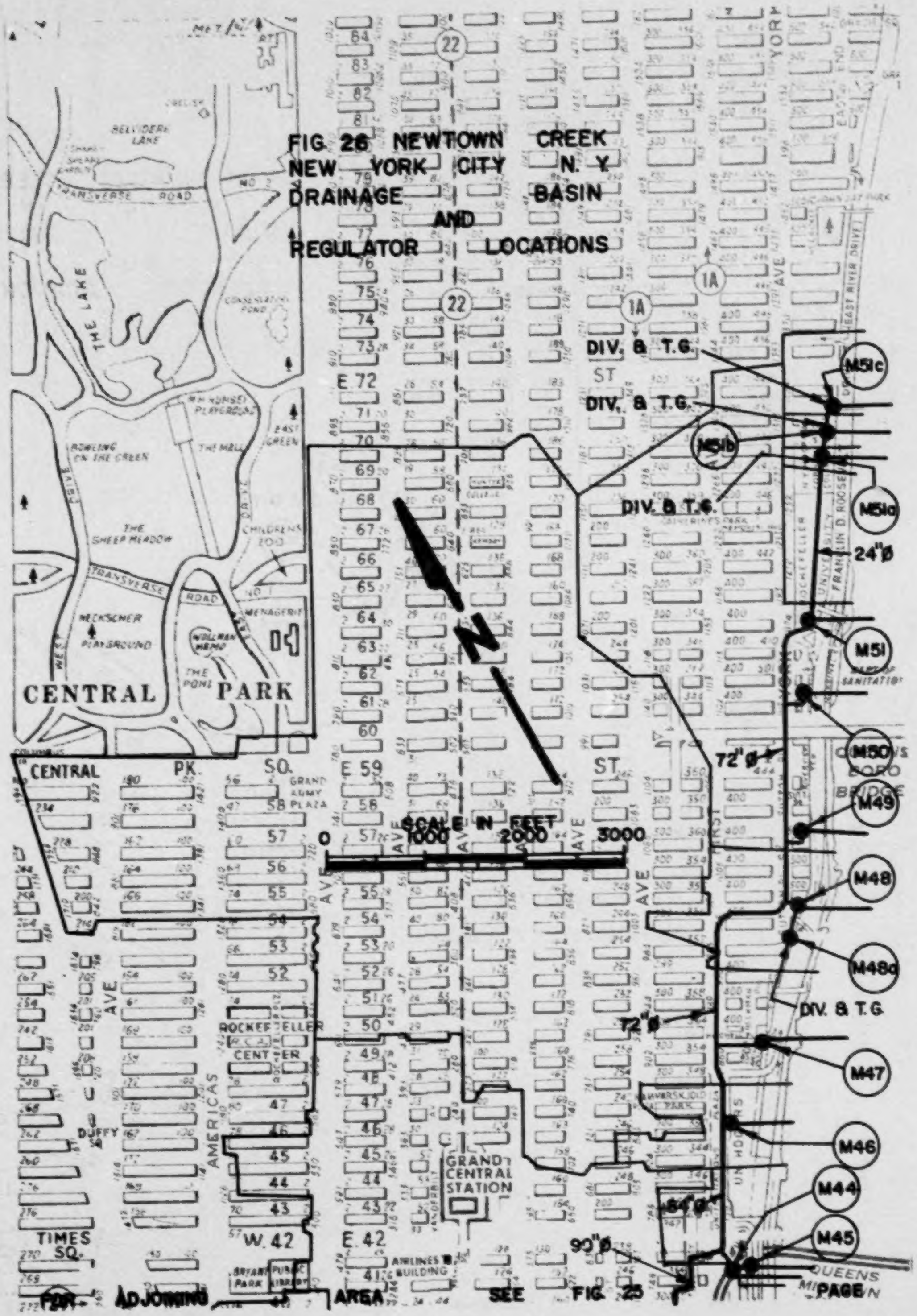

FIG. 26 NEWTOWN CREEK NEW YORK CITY N.Y. DRAINAGE BASIN AND REGULATOR LOCATIONS

CENTRAL PARK
THE LAKE
BELVIDERE LAKE
TRANSVERSE ROAD
THE SHEEP MEADOW
THE MALL
HECKSCHER PLAYGROUND
THE POND
CHILDRENS ZOO
MENAGERIE
EAST GREEN
CONSERVATORY POND
CENTRAL PK. SO.
GRAND ARMY PLAZA
E 59 ST
E 72 ST
W. 42
E. 42
ROCKEFELLER CENTER
DUFFY SQ
TIMES SQ.
AVE OF THE AMERICAS
BRYANT PARK
PUBLIC LIBRARY
GRAND CENTRAL STATION
AIRLINES BUILDING
YORK AVE
EAST END AVE
EAST RIVER DRIVE
FRANKLIN D ROOSEVELT DRIVE
QUEENS BORO BRIDGE
QUEENS MIDTOWN
N
1A
22
DIV. & T.G.
M51c
M51b
M51a
24"Ø
M51
M50
72"Ø
M49
M48
M48a
M47
M46
M44
M45
84"Ø
90"Ø
SCALE IN FEET
0
1000
2000
3000
FOR ADJOINING AREA SEE FIG. 25 PAGE

SECTION XI

NORTH RIVER SEWAGE TREATMENT PLANT

DRAINAGE BASIN, NEW YORK, N.Y.

The drainage area contributory to the future North River Sewage Treatment Plant (presently under construction) contains sixty-one regulator structures. Thirty-five consist of sluice gates with hydraulic float systems, twenty are simple diversion or tide gate chambers, four are manual sluice gates with provisions for hydraulic systems. These regulators are in various stages of construction and as such no field inspections were conducted in this drainage area.

The North River Sewage Treatment Plant (operational 1979) will receive influents from four interceptors (expected completion 1974) and will treat approximately 220 million gallons per day of waste.

Additional information regarding the regulators within this drainage area is found in Table 6 and Figures 27 through 32.

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TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
N-1	Harlem River Dr. near 10th Ave.	12" ø Manually Operated Sluice Gate	44	1,000	N/A	N/A	70	0	0	30	0.271	N/A
N-2	Academy Street & W. 201st St.	Tide Gate Chamber	229 (Combined Data For Regulators N-2 & N-3)	47,800	N/A	N/A	85	10	0	5	12.94	N/A
N-3	W. 201st St. & Harlem River Dr.	30" x 24" Sluice Gate With Hydraulic Float System										
N-4	W. 203rd St. & Harlem River Dr.	12" ø Manually Operated Sluice Gate with Provisions for Future Hydraulic System	6	100	N/A	N/A	5	0	95	0	0.028	N/A
N-5	W. 205th St. & Harlem River Dr.	12" ø Manually Operated Sluice Gate with Provisions for Future Hydraulic System	10	300	N/A	N/A	30	0	70	0	0.080	N/A
N-6	W. 206th St. & Harlem River Dr.	12" ø Manually Operated Sluice Gate	3	100	N/A	N/A	30	0	70	0	0.028	N/A
N-7	W. 207th St. & Harlem River Dr.	12" ø Manually Operated Sluice Gate	4 (Combined Data For Regulators N-7 & N-8)	100	N/A	N/A	5	0	95	0	0.028	N/A

TABLE 6 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
N-1	--	12" ø BR INT	24" ø CI	24" ø CI	4'-0" ø BRICK	Harlem River	--	--	Under Construction	31
N-2	--	--	Two 6'-0"x 7'-0" FTRC	Two 6'-0"x 7'-0" FTRC	Two 6'-0"x 7'-0" FTRC	Harlem River	--	--	Under Construction	-
N-3	--	42" ø BR INT	6'-0"x 4'-0"	6'-0"x 4'-0"	6'-0"x 4'-0"	Harlem River	--	--	Under Construction	31
N-4	42" ø PRCP	15" ø VP BR INT To 42" ø PRCP	3'-6"x 2'-4" BRICK	3'-6"x 2'-4" BRICK	3'-6"x 2'-4" BRICK	Harlem River	--	--	Under Construction	31
N-5	42" ø PRCP	15" ø VP BR INT To 42" ø PRCP	4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	Harlem River	--	--	Under Construction	31
N-6	42" ø PRCP	15" ø VP BR INT To 42" ø PRCP	3'-6"x 2'-4" BRICK	3'-6"x 2'-4" BRICK	3'-6"x 2'-4" BRICK	Harlem River	--	--	Under Construction	31
N-7	42" ø PRCP	15" ø VP BR INT To 42" ø PRCP	3'-6"x 2'-4" BRICK	3'-6"x 2'-4" BRICK	3'-6"x 2'-4" BRICK	Harlem River	--	--	Under Construction	31

TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
N-8	W. 207th St. & Harlem River Dr.	Diversion (Weir) & Tide Gate Chambers	(See Regulator N-7 For Combined Data)									
N-9	IND Subway Yard, South End of Inspection Shed (W. 209th St.)	18" x 12" Sluice Gate With Hydraulic Float System	88 (Combined Data For Regulators N-9 Through N-12)	6,800	N/A	N/A	30	10	60	0	1.866	N/A
N-10	IND Subway Yard, East of Inspection Shed (W. 211th St.)	Diversion Chamber (Drop Manhole)										
N-11	IND Subway Yard, East of Inspection Shed (W. 211th St.)	Tide Gate										
N-12	IND Subway Yard, North of Inspection Shed (W. 213th St.)	Diversion (Drop Manhole) & Tide Gate Chambers										
N-13	W. 215th St. & Harlem River Dr.	Diversion Chamber	3	100	N/A	N/A	0	0	100	0	0.028	N/A
N-14	W. 216th St. & Harlem River Dr.	Diversion Chamber	73	3,400	N/A	N/A	0	10	90	0	0.920	N/A

TABLE 6 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS Interceptor Line Upstream	 Downstream	 Trunk Line	 By-Pass Line	 Outfall	Receiving Waterway	INSPECTION DATA Date	 Operable (Yes or No)	 Comments	Figure No. for Location of Regulator
N-8	--	--	3'-6" x 2'-4" BRICK	3'-6" x 2'-4" BRICK	5'-0" x 2'-4"	Harlem River	--	--	Under Construction	31
N-9	24" ø PRCP	24" ø PRCP	3'-6" x 2'-4" BRICK	3'-6" x 2'-4" BRICK	4'-0" ø BRICK	Harlem River	--	--	Under Construction	31
N-10	18" ø VP	24" ø VP	4'-6" ø BRICK	4'-6" ø BRICK	4'-6" ø BRICK	Harlem River	--	--	Under Construction	31
N-11	--	--	4'-6" ø BRICK	4'-6" ø BRICK	4'-6" ø BRICK	Harlem River	--	--	Under Construction	-
N-12	18" ø VP	18" ø VP	4'-0" x 2'-8" BRICK	4'-0" x 2'-8" BRICK	4'-0" x 2'-8" BRICK	Harlem River	--	--	Under Construction	31
N-13	18" ø VP	18" ø VP	3'-6" x 2'-4" BRICK	3'-6" x 2'-4" BRICK	3'-6" x 2'-4" BRICK	Harlem River	--	--	Under Construction	31
N-14	--	18" ø VP BR INT	5'-0" x 4'-0" BRICK	5'-0" x 4'-0" BRICK	5'-0" x 4'-0" BRICK	Harlem River	--	--	Under Construction	31

TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
N-15	W. 218th St. & Indian Road	12" x 12" Sluice Gate With Hydraulic Float System	69	3,800	N/A	N/A	15	5	0	80	1.029	N/A
N-16	Dyckman St. & Hudson River	30" x 24" Sluice Gate With Hydraulic Float System	494	40,100	N/A	N/A	45	5	5	45	10.855	N/A
			(Combined Data For Regulators N-16 & N-16A)									
N-16A	Dyckman & Henshaw Streets	Tide Gate & Diversion Chambers										
N-17	W. 190th St. & Riverside Dr.	12" ϕ Manually Operated Shear Gate	26	800	N/A	N/A	10	0	0	90	0.217	N/A
N-18	W. 172nd St. & Fort Washington Park	30" x 34" Sluice Gate With Hydraulic Float System	292	41,200	N/A	N/A	70	0	0	30	12.747	N/A
N-19	W. 158th St & Riverside Dr.	24" x 18" Sluice Gate With Hydraulic Float System	117	31,300	N/A	N/A	70	5	0	25	9.684	N/A
N-20	W. 155th St. & Riverside Dr.	12" x 12" Sluice Gate With Hydraulic Float System	86	11,600	N/A	N/A	75	3	0	22	3.589	N/A
			(Combined Data For Regulators N-20 Through N-21B)									

TABLE 6 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
N-15	6'-6" x 5'-0"	21" ø VP BR INT To 6'-6" x 5'-0" BRICK	2'-4" x 4'-0" FTRC	2'-4" x 4'-0" FTRC	2'-4" x 4'-0" FTRC	Harlem River	--	--	Under Construction	31
N-16	6'-6" x 5'-0"	48" ø PRCP BR INT To 6'-6" x 5'-0"	TWO 5'-0" x 7'-0" FTRC	TWO 5'-0" x 7'-0" FTRC	TWO 5'-0" x 7'-0" FTRC	Hudson River	--	--	Under Construction	31
N-16A	--	--	3'-0" ø BRICK	3'-0" ø BRICK	3'-0" ø BRICK	Hudson River	--	--	Under Construction	31
N-17	6'-6" x 6'-6"	15" ø VP BR INT To 6'-6" x 6'-6"	16" ø CI	16" ø CI	16" ø CI	Hudson River	--	--	Under Construction	31
N-18	6'-6" x 6'-0"	42" ø PRCP BR INT To 6'-6" x 6'-0"	5'-0" x 5'-0" FTRC	5'-0" x 5'-0" FTRC	5'-0" x 5'-0" FTRC	Hudson River	--	--	Under Construction	30
N-19	7'0" x 6'-6"	1'-9" x 6'-0" BR INT To 7'-0" x 6'-6"	5'-0" x 5'-0" FTRC	5'-0" x 5'-0" FTRC	4'-0" ø	Hudson River	--	--	Under Construction	30
N-20	7'-0" x 6'-6"	24" ø BR INT To 7'-0" x 6'-6"	3'-6" x 2'-4" BRICK	3'-6" x 2'-4" BRICK	3'-0" ø	Hudson River	--	--	Under Construction	30

TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Ots.		
N-21	W. 152nd St. & Riverside Dr.	12" x 12" Sluice Gate With Hydraulic Float System	(See Regulator N-20 For Combined Data)									
N-21A	W. 151st St. & Riverside Dr.	Diversion Chamber (Weir)										
N-21B	W. 153rd St. & Riverside Dr.	Diversion Chamber (Weir)										
N-22	W. 138th St & Twelth Ave.	12" x 12" Sluice Gate With Hydraulic Float System	45	7,400	N/A	N/A	60	0	30	10	2.290	N/A
N-23	St. Clair Place	Two 36" x 24" Sluice Gates With Independent Hydraulic Float Systems	614	167,300	N/A	N/A	60	0	25	15	51.763	N/A
N-24	W. 115th St. & Riverside Dr.	12" x 18" Sluice Gate With Hydraulic Float System	100	13,800	N/A	N/A	65	0	0	35	4.270	N/A
N-25	W. 108th St. & Riverside Dr.	18" x 18" Sluice Gate With Hydraulic Float System	80	22,600	N/A	N/A	80	0	0	20	6.992	N/A

TABLE 6 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
N-21	7'-0" x 6'-6"	15' ø BR INT To 7'-0" x 6'-6"	3'-0" BRICK	3'-0" BRICK	3'-0" BRICK	Hudson River	--	--	Under Construction	30
N-21A	--	--	3'-6" x 2'-4"	3'-6" x 2'-4"	3'-0" ø	Hudson River	--	--	Under Construction	30
N-21B	--	--	3'-6" x 2'-4"	3'-6" x 2'-4"	3'-0" ø	Hudson River	--	--	Under Construction	30
N-22	16'-0" x 16'-0"	24" ø BR INT To 16'-0" x 16'-0"	36" ø BRICK	36" ø BRICK	36" ø BRICK	Hudson River	--	--	Under Construction	30
N-23	14'-6" x 14'-6"	4'-3" x 7'-6" BR INT To 16'-0" x 16'-0"	TWO 7'-0" x 8'-8" FTRC	TWO 7'-0" x 8'-8" FTRC	TWO 7'-0" x 8'-8" FTRC	Hudson River	--	--	Under Construction	30
N-24	14'-6" x 14'-6"	30" ø BR INT To 14'-6" x 14'-6"	4'-0" x 3'-0" BRICK	4'-0" x 3'-0" BRICK	4'-0" x 3'-0" BRICK	Hudson River	--	--	Under Construction	29
N-25	14'-0" x 14'-0"	36" ø BR INT To 14'-6" x 14'-6"	4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	Hudson River	--	--	Under Construction	29

TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
N-26	W. 96th St. & Riverside Park	Two 30" x 24" Sluice Gates With Independent Hydraulic Float Systems	561	103,300	N/A	N/A	75	0	0	25	31.961	N/A
			(Combined Data For Regulators N-26 & N-26A)									
N-26A	W. 96th St. & Riverside Park	Diversion & Tide Gate Chambers										
N-27	W. 90th St. & Riverside Dr.	12" x 12" Sluice Gate With Hydraulic Float System	27	3,600	N/A	N/A	20	0	0	80	1.114	N/A
N-28	W. 80th St. & Riverside Park	36" x 42" Sluice Gate With Hydraulic Float System	418	93,100	N/A	N/A	60	15	0	25	28.805	N/A
N-29	W. 72nd St. West of Riverside Dr.	36" x 36" Sluice Gate With Hydraulic Float System	667	106,500	N/A	N/A	40	30	0	30	32.951	N/A
			(Combined Data For Regulators N-29 & N-29A)									
N-29A	W. 66th St. & Freedom Place	24" x 36" Sluice Gate With Hydraulic Float System										
N-30	W. 59th St. & Twelfth Ave.	12" x 18" Sluice Gate With Hydraulic Float System	96	9,400	12,400	22,300	5	0	95	0	4.004	N/A

TABLE 6 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line Upstream	Interceptor Line Downstream	Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
N-26	14'-0" x 14'-0"	14'-0" x 14'-0"	--	--	--	--	--	--	Under Construction	29
N-26A	--	54" ø RC BR INT To N-26	6'-0" x 10'-0"	6'-0" x 10'-0"	6'-0" x 10'-0"	Hudson River	--	--	Under Construction	29
N-27	14'-0" x 14'-0"	18" ø BR INT To 14'-0" x 14'-0"	3'-6" x 2'-8" BRICK	3'-6" x 2'-8" BRICK	3'-6" x 2'-8" BRICK	Hudson River	--	--	Under Construction	29
N-28	11'-6" x 11'-6"	5'-0" x 5'-0" BR INT To 14'-0" x 14'-0"	6'-0" x 10'-6" FTRC	6'-0" x 10'-6" FTRC	6'-0" x 10'-6" FTRC	Hudson River	--	--	Under Construction	28
N-29	11'-6" x 11'-6"	6'-0" x 5'-0" BR INT To 11'-6" x 11'-6"	4'-0" x 5'-0" & 7'-0" x 7'-0" FTRC	7'-0" x 7'-0" FTRC	TWO 3'-0" x 4'-0"	Hudson River	--	--	Under Construction	28
N-29A	10'-6" x 10'-6"	60' ø BR INT To 11'-6" x 11'-6"	5'-0" x 5'-6" FTRC	5'-0" x 5'-6" FTRC	5'-0" x 5'-6" FTRC	Hudson River	--	--	Under Construction	28
N-30	10'-6" x 10'-6"	30" ø BR INT To 10'-6" x 10'-6"	5'-3" x 5'-3" FTRC	5'-3" x 5'-3" FTRC	5'-3" x 5'-3" FTRC	Hudson River	--	--	Under Construction	28

TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
N-31	W. 56th St. & Twelfth Ave.	12" x 12" Sluice Gate With Hydraulic Float System	52	2,700	10,100	12,100	25	0	70	5	1.569	N/A
N-32	W. 50th St. & Twelfth Ave.	12" x 12" Sluice Gate With Hydraulic Float System	33	2,100	3,500	7,700	0	10	85	5	0.982	N/A
N-33	W. 48th St. & Twelfth Ave.	Two 2'-6" x 3'-6" Sluice Gates With Independent Hydraulic Float Systems	571 (Combined Data For Regulators N-33 through N-35)	100,500	378,300	252,200	15	60	20	5	54.502	N/A
N-34	W. 48th St. & Twelfth Ave.	Tide Gate										
N-35	W. 47th St. & Twelfth Ave.	Tide Gate										
N-36	W. 46th St. & Twelfth Ave.	12" x 12" Sluice Gate With Hydraulic Float System	26 (Combined Data For Regulators N-36 & N-37)	2,100	4,700	4,300	0	0	100	0	0.964	N/A
N-37	W. 46th St. & Twelfth Ave.	Tide Gate										
N-38	W. 44th St. & Twelfth Ave.	12" x 12" Sluice Gate With Hydraulic Float System	19	700	2,500	4,400	0	0	100	0	0.421	N/A

TABLE 6 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
N-31	10'-6" x 10'-6"	18" ø BR INT To 10'-6" x 10'-6"	4'-6" x 6'-0" FTRC	4'-6" x 6'-0" FTRC	3'-0" ø	Hudson River	--	--	Under Construction	28
N-32	8'-6" x 8'-6"	10'-6" x 10'-6"	4'-0" x 4'-0" FTRC	4'-0" x 4'-0" FTRC	TWO 4'-0" x 4'-0"	Hudson River	--	--	Under Construction	28
N-33	8'-6" x 8'-6"	8'-0" x 8'-0" BR INT To 10'-6" x 10'-6"	4'-0" x 9'-0" FTRC	4'-0" x 9'-0" FTRC	4'-0" x 2'-8"	Hudson River	--	--	Under Construction	28
N-34	--	--	4'-0" x 2'-8" FTRC	4'-0" x 2'-8" FTRC	4'-0" x 2'-8" FTRC	Hudson River	--	--	Under Construction	28
N-35	--	--	4'-0" x 2'-8" FTRC	4'-0" x 2'-8" FTRC	4'-0" x 2'-8" FTRC	Hudson River	--	--	Under Construction	-
N-36	8'-6" x 8'-6"	15" ø VP BR INT To 8'-6" x 8'-6"	4'-0" ø RC	4'-0" ø RC	4'-0" ø WOOD	Hudson River	--	--	Under Construction	28
N-37	--	--	TWO 6'-6" x 8'-6" FTRC	TWO 6'-6" x 8'-6" FTRC	TWO 6'-6" x 8'-6" FTRC	Hudson River	--	--	Under Construction	-
N-38	8'-6" x 8'-6"	15" ø BR INT To 8'-6" x 8'-6"	4'-6" ø RC	4'-6" ø RC	4'-6" ø RC	Hudson River	--	--	Under Construction	28

TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population Residential	Population Working	Population Transient	Percent Land Use Res.	Percent Land Use Com.	Percent Land Use Ind.	Percent Land Use Oth.	Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
N-39	W. 43rd St. & Twelfth Ave.	12" x 12" Sluice Gate With Hydraulic Float System	31	900	3,000	7,200	0	0	100	0	0.575	N/A
			(Combined Data For Regulators N-39 Through N-41)									
N-40	W. 42nd St. & Twelfth Ave.	Diversion (Weir) & Tide Gate Chambers										
N-41	W. 42nd St. & Twelfth Ave.	Tide Gate										
N-42	W. 40th St. & Twelfth Ave.	12" x 12" Sluice Gate With Hydraulic Float System	23	400	1,000	5,400	0	0	100	0	0.295	N/A
N-43	W. 36th St. & Twelfth Ave.	5'-0" x 3'-0" Sluice Gate With Hydraulic Float System	48	6,100	34,600	11,200	0	10	90	0	3.753	N/A
			(Combined Data For Regulators N-43 & N-44)									
N-44	W. 33rd St. & Twelfth Ave.	Tide Gate										
N-45	W. 30th St. & Twelfth Ave.	Two 24" x 30" Sluice Gates With Independent Hydraulic Float Systems	347	42,200	284,000	189,300	5	55	40	0	30.631	N/A

TABLE 6 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS Interceptor Line Upstream	 Downstream	 Trunk Line	 By-Pass Line	 Outfall	Receiving Waterway	INSPECTION DATA Date	 Operable (Yes or No)	 Comments	Figure No. for Location of Regulator
N-39	8'-6" x 6'-6"	18" ø VP BR INT To 8'-6" x 8'-6"	4'-0" x 2'-8" BRICK	4'-0" x 2'-8" BRICK	4'-0" x 2'-8" BRICK	Hudson River	--	--	Under Construction	28
N-40	--	--	4'-6" x 9'-0" SEMI- CIRC BRICK	4'-6" x 9'-0" SEMI- CIRC BRICK	4'-6" x 9'-0" SEMI- CIRC BRICK	Hudson River	--	--	Under Construction	28
N-41	--	--	TWO 2'-0" x 8'-0" BRICK	TWO 2'-0" x 8'-0" BRICK	TWO 2'-0" x 8'-0" BRICK	Hudson River	--	--	Under Construction	-
N-42	8'-6" x 8'-6"	15" ø BR INT To 8'-6" x 8'-6"	5'-6" x 2'-8" PTRC	5'-6" x 2'-8" PTRC	5'-6"x 2'-8" PTRC	Hudson River	--	--	Under Construction	28
N-43	8'-0" x 8'-0"	24" ø BR INT To 8'-0" x 8'-0"	4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	Hudson River	--	--	Under Construction	27
N-44	--	--	4'-6" x 4'-9"	4'-6" x 4'-9"	4'-6" x 4'-9"	Hudson River	--	--	Under Construction	-
N-45	8'-0" x 8'-0"	6'-0" x 6'-0" BR INT To 8'-0" x 8'-0"	4'-0" ø BRICK & 4'-0" ø CONC & 6'-0" x 11'-0" PTRC	4'-0" ø BRICK & 4'-0" ø CONC & 6'-0" x 11'-0" PTRC	6'-0" x 11'-0" & 4'-0" ø BRICK	Hudson River	--	--	Under Construction	27

TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
N-46	W. 26th St. & Twelfth Ave.	18" x 12" Sluice Gate With Hydraulic Float System	78	10,600	13,400	18,200	60	10	20	10	4.313	N/A
N-47	W. 23rd St. & Twelfth Ave.	24" x 12" Sluice Gate With Hydraulic Float System	67	12,600	6,800	17,300	50	50	0	0	4.616	N/A
N-48	W. 21st St. & Eleventh Ave.	12" x 18" Sluice Gate With Hydraulic Float System	66	11,500	4,600	15,400	70	0	30	0	4.127	N/A
			(Combined Data For Regulators N-48 & N-49)									
N-49	W. 21st St. & Eleventh Ave.	Tide Gate & Diversion (Weir) Chambers										
N-50	W. 18th St. & Eleventh Ave.	3'-0" x 2'-6" Sluice Gate With Hydraulic Float System	166	10,600	126,000	84,000	10	50	40	0	11.046	N/A
N-51	W. 17th St. & Eleventh Ave.	18" x 24" Sluice Gate With Hydraulic Float System	110	16,500	34,200	25,700	10	40	50	0	7.286	N/A
			(Combined Data For Regulatores N-51 & N-52)									
N-52	W. 14th St. & Eleventh Ave.	Tide Gate										
N-53	Bloomfield & West Streets	Tide Gate & Diversion Chamber	26	1,800	6,700	6,100	2	8	90	0	1.009	N/A
			(Combined Data For Regulators N-53 & N-54)									

TABLE 6 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
N-46	7'-0" x 7'-0"	30" ø BR INT To 8'-0" x 8'-0"	5'-7" x 6'-3" BRICK	5'-7" x 6'-3" BRICK	5'-7" x 6'-3" BRICK	Hudson River	--	--	Under Construction	27
N-47	7'-0" x 7'-0"	30" ø BR INT To 7'-0" x 7'-0"	5'-6" x 6'-6"	5'-6" x 6'-6"	4'-0" ø	Hudson River	--	--	Under Construction	27
N-48	7'-0" x 7'-0"	30" ø BR INT To 7'-0" x 7'-0"	4'-0" ø BRICK	4'-0" ø BRICK	4'-0" ø BRICK	Hudson River	--	--	Under Construction	27
N-49	--	--	6'-4" x 4'-6" PTRC	6'-4" x 4'-6" PTRC	4'-0" ø	Hudson River	--	--	Under Construction	27
N-50	5'-6" x 5'-0"	60" ø BR INT To 7'-0" x 7'-0"	5'-6" x 8'-0" PTRC	5'-6" x 8'-0" PTRC	5'-0" x 3'-9" & 5'-0" x 4'-6"	Hudson River	--	--	Under Construction	27
N-51	30" ø	36" ø BR INT To 5'-0" x 5'-0"	4'-6" ø BRICK	4'-6" ø BRICK	4'-6" ø BRICK	Hudson River	--	--	Under Construction	27
N 52	--	--	4'-0" x 6'-0"	4'-0" x 6'-0"	4'-0" x 6'-0"	Hudson River	--	--	Under Construction	-
N-53	30" ø	12" ø VP BR INT To 30" ø	4" ø CI & 5" ø CI	12" ø VP	3'-6" x 2'-4" BRICK	Hudson River	--	--	Under Construction	27

TABLE 6 - NORTH RIVER TREATMENT PLANT DRAINAGE BASIN (Continued)

NEW YORK, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
N-54	Gansevoort St. & North River	12" x 12" Sluice Gate With Hydraulic Float System	(See Regulator N-53 For Combined Data)									
N-55	West & Jane Streets	18" x 12" Sluice Gate With Hydraulic Float System	56	7,500	10,700	13,000	50	5	45	0	3.117	N/A
N-56	West & Bank Streets	12" x 12" Sluice Gate With Hydraulic Float System	19	2,100	3,700	4,400	70	10	20	0	0.917	N/A

NOTES FOR TABLE 6:

Regulator Data - taken from regulator detail sheets (1965) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Drainage Area Data - for regulators N-1, N-18, N-32 & N-38 through N-42: boundaries determined from Existing Sewer Line Maps of New York City. Acreage calculated from the layout of the drainage area boundaries.
for the remaining regulators: taken from records supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Population Data - from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (for the year 2000).

Land Use Data - estimated from Land Use Policy Maps in Plan for New York City, A Proposal-1969, Volume 4-Manhattan prepared by the New York City Planning Commission.

Hydraulic Data - taken from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (projected for the year 2000).

TABLE 6 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
N-54	30" ∅	18" ∅ BR INT To 30" ∅	4'-0" x 2'-8" BRICK	4'-0" x 2'-8" BRICK	4'-0" ∅ BRICK	Hudson River	--	--	Under Construction	27
N-55	30" ∅	24" ∅ BR INT To 30" ∅	4'-0" x 3'-8" FTRC	4'-0" x 3'-8" FTRC	4'-0" ∅	Hudson River	--	--	Under Construction	27
N-56	--	18" ∅ BR INT To 18" ∅	4'-0" x 3'-8"	4'-0" x 3'-8"	4'-0" ∅	Hudson River	--	--	Under Construction	27

NOTES FOR TABLE 6 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Existing Sewer Line Maps of New York City.

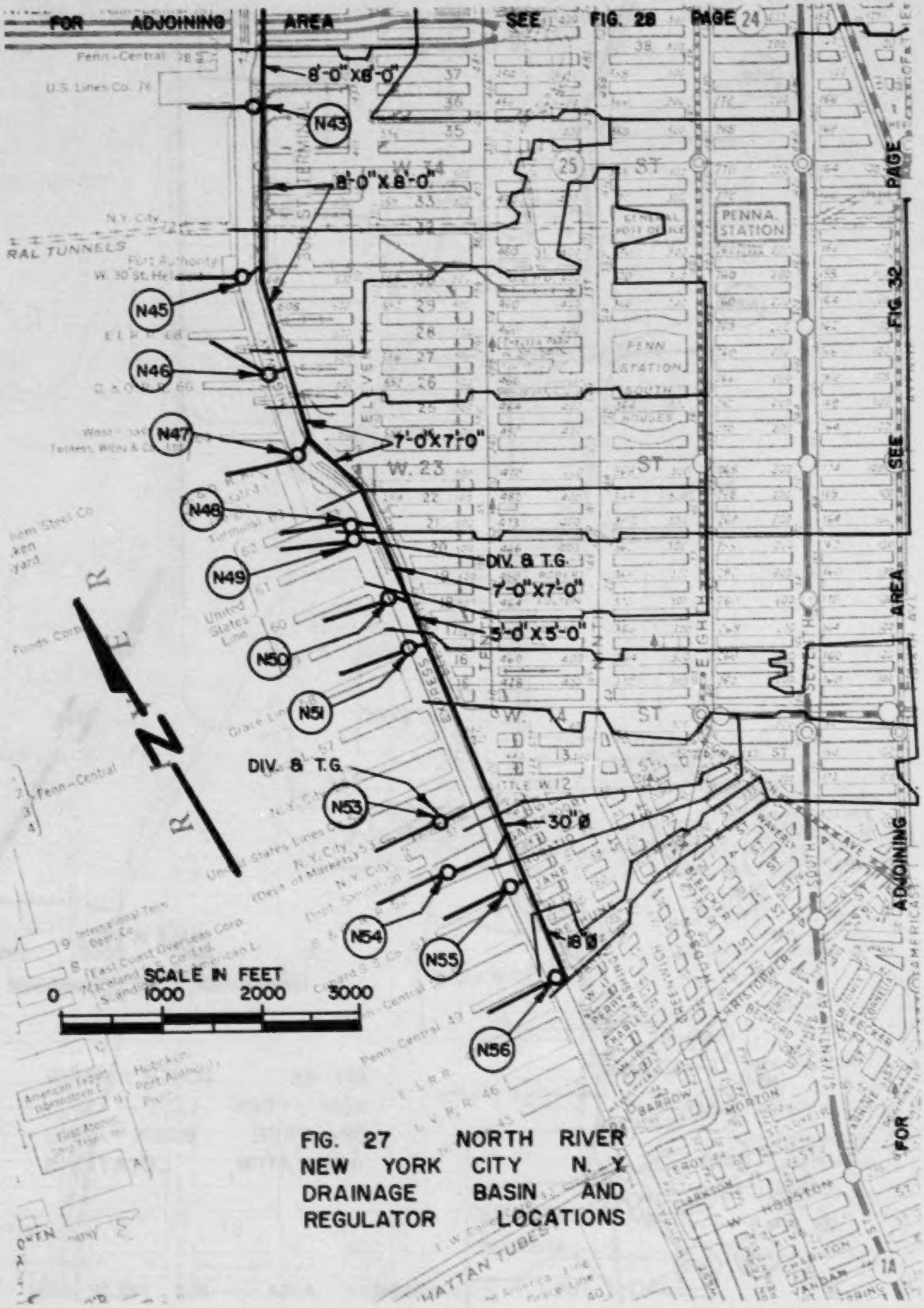

FOR ADJOINING AREA SEE FIG. 28 PAGE 24
8'-0"X8'-0"
N43
8'-0"X8'-0"
PENNA. STATION
PENN STATION
N45
N46
N47
7'-0"X7'-0"
N48
DIV. & T.G.
N49
7'-0"X7'-0"
5'-0"X5'-0"
N50
N51
DIV. & T.G.
N53
30"Ø
N54
N55
18"Ø
N56
N
SCALE IN FEET
0
1000
2000
3000
SEE FIG. 32 PAGE
FOR ADJOINING AREA

FIG. 27 NORTH RIVER NEW YORK CITY N. Y. DRAINAGE BASIN AND REGULATOR LOCATIONS

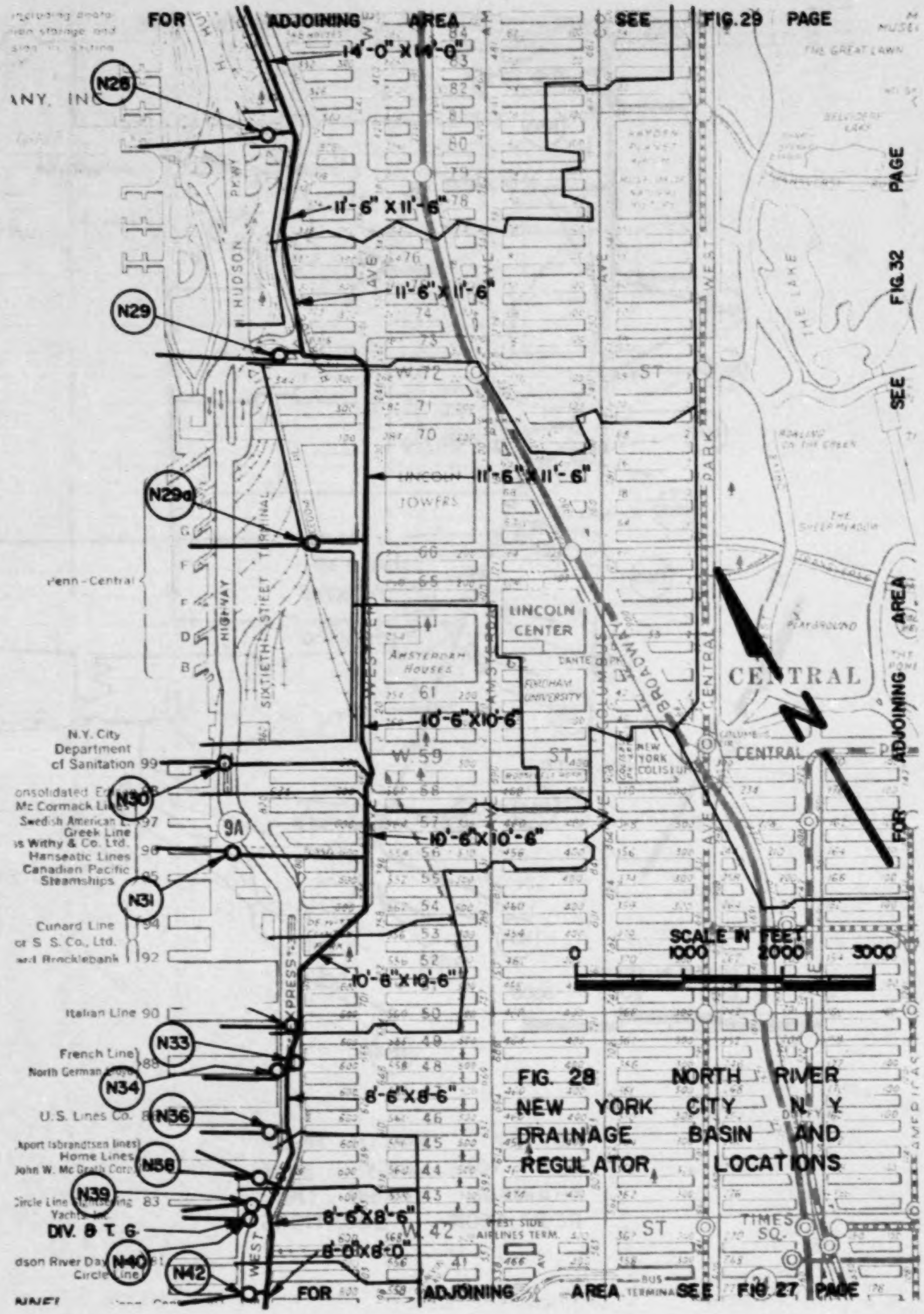
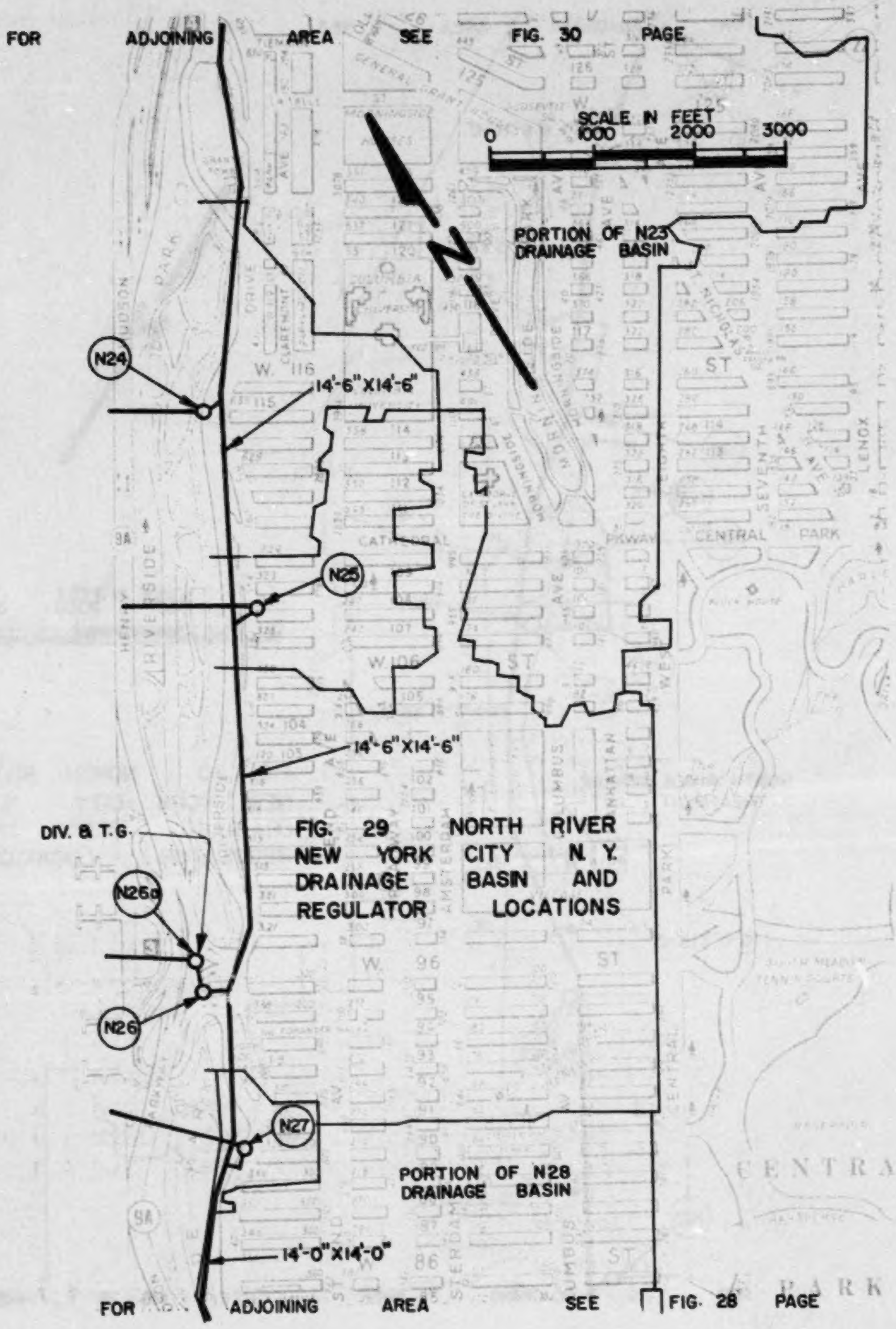


FIG. 28 NORTH RIVER NEW YORK CITY N. Y. DRAINAGE BASIN AND REGULATOR LOCATIONS

FOR ADJOINING AREA SEE FIG. 29 PAGE
SEE FIG. 32 PAGE FOR ADJOINING AREA
FOR ADJOINING AREA SEE FIG. 27 PAGE
14'-0" X 14'-0"
11'-6" X 11'-6"
11'-6" X 11'-6"
11'-6" X 11'-6"
10'-6" X 10'-6"
10'-6" X 10'-6"
10'-6" X 10'-6"
8'-6" X 8'-6"
8'-6" X 8'-6"
8'-0" X 8'-0"
N28
N29
N29a
N30
N31
N33
N34
N36
N38
N39
N40
N42
DIV. & T. G.
N.Y. City Department of Sanitation 99
Consolidated Ed
Mc Cormack Line
Swedish American
Greek Line
Furness Withy & Co. Ltd.
Hanseatic Lines
Canadian Pacific Steamships
Cunard Line
Brocklebank
Italian Line 90
French Line 88
North German Lloyd
U.S. Lines Co.
Home Lines
John W. Mc Grath Corp.
Circle Line Sightseeing 83
Yachts
Hudson River Day Line
Circle Line
Penn-Central
HUDSON PKWY
HIGHWAY
SIXTIETH STREET TERMINAL
WEST END AVE
AMSTERDAM AVE
COLUMBUS AVE
BROADWAY
CENTRAL PARK WEST
W. 72 ST
W. 59 ST
W. 42 ST
LINCOLN TOWERS
LINCOLN CENTER
AMSTERDAM HOUSES
FORDHAM UNIVERSITY
NEW YORK COLISEUM
HAYDEN PLANETARIUM
THE GREAT LAWN
BELVEDERE LAKE
THE LAKE
THE SHEEP MEADOW
CENTRAL PARK
TIMES SQ.
WEST SIDE AIRLINES TERM.
BUS TERMINAL
9A
N
SCALE IN FEET
0
1000
2000
3000

FOR ADJOINING AREA SEE FIG. 30 PAGE



SCALE IN FEET
0
1000
2000
3000
N
PORTION OF N23 DRAINAGE BASIN
N24
14'-6" X 14'-6"
N25
14'-6" X 14'-6"
DIV. & T.G.
N25a
N26
N27
PORTION OF N28 DRAINAGE BASIN
14'-0" X 14'-0"
RIVERSIDE
DRIVE
HUDSON
PARK
CLAREMONT
AVE
W. 116
CATHEDRAL
PKWAY
CENTRAL PARK
W. 106
ST
SEVENTH
LENOX
ST. NICHOLAS
MORNINGSIDE
MANHATTAN
COLUMBUS
AMSTERDAM
W. 96
ST
W. 86
ST
CENTRAL PARK WEST
9A
CENTRA
PARK

FIG. 29 NORTH RIVER NEW YORK CITY N.Y. DRAINAGE BASIN AND REGULATOR LOCATIONS

FOR ADJOINING AREA SEE FIG. 28 PAGE

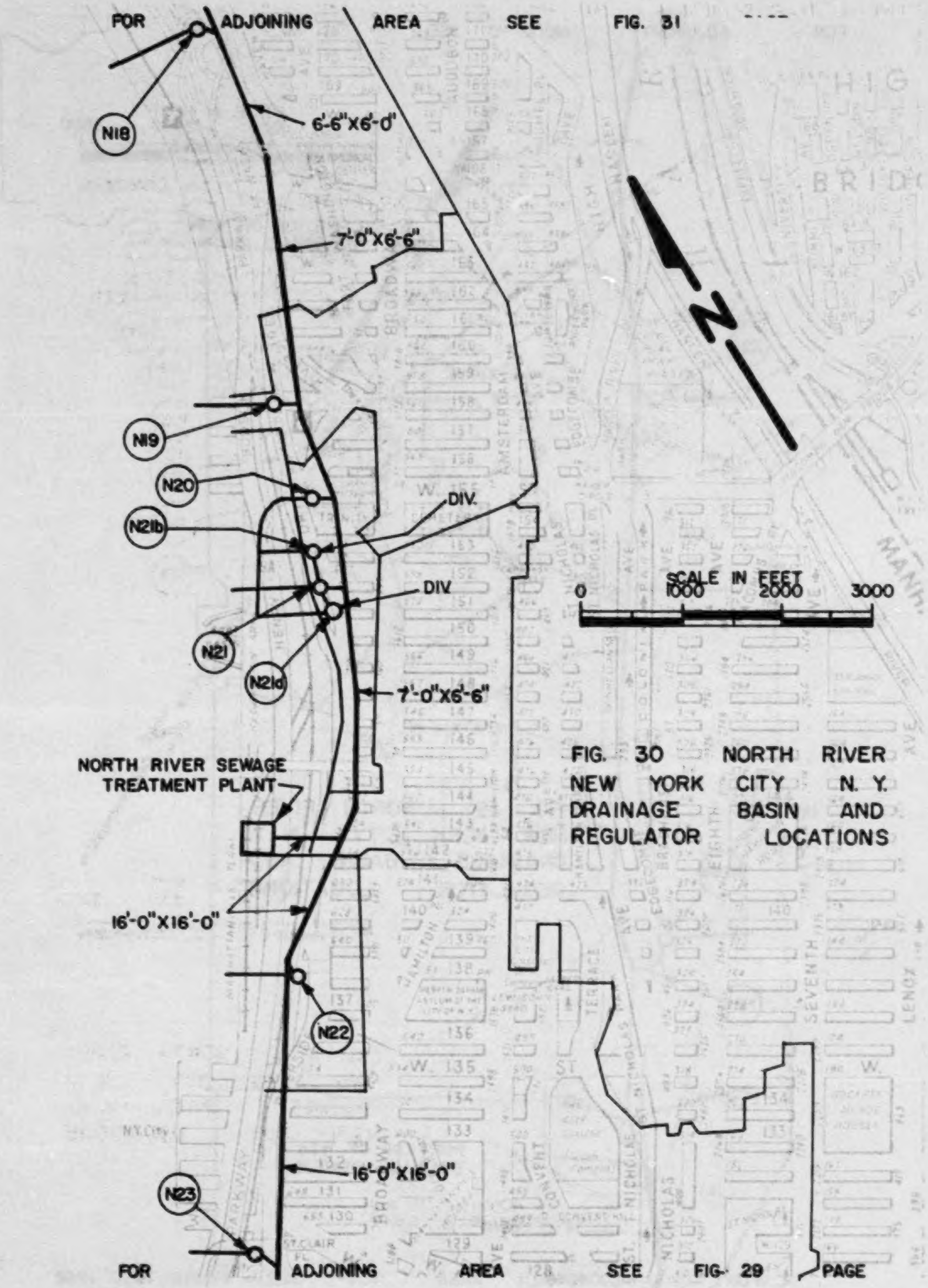

FOR ADJOINING AREA SEE FIG. 31
N18
6'-6"X6'-0"
7'-0"X6'-6"
N
N19
N20
N21b
DIV.
DIV.
N21
N21a
7'-0"X6'-6"
SCALE IN FEET
0
1000
2000
3000
NORTH RIVER SEWAGE TREATMENT PLANT
16'-0"X16'-0"
N22
16'-0"X16'-0"
N23
FOR ADJOINING AREA SEE FIG. 29 PAGE
AMSTERDAM
BROADWAY
ST. NICHOLAS
CONVENT
HAMILTON
EDGECOMBE
EIGHTH
SEVENTH
LENOX
HIGH BRIDGE

FIG. 30 NORTH RIVER
NEW YORK CITY N. Y.
DRAINAGE BASIN AND
REGULATOR LOCATIONS

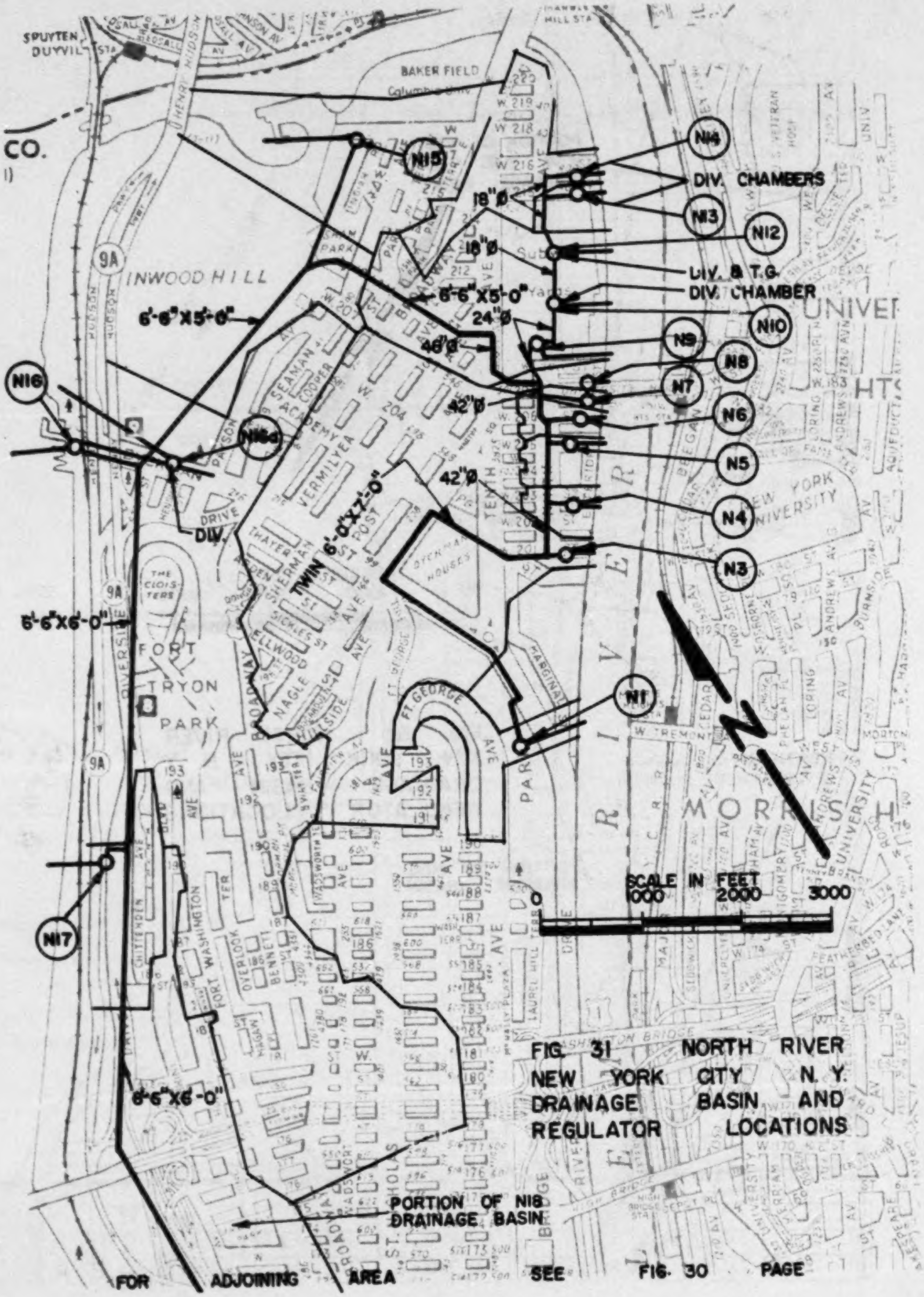
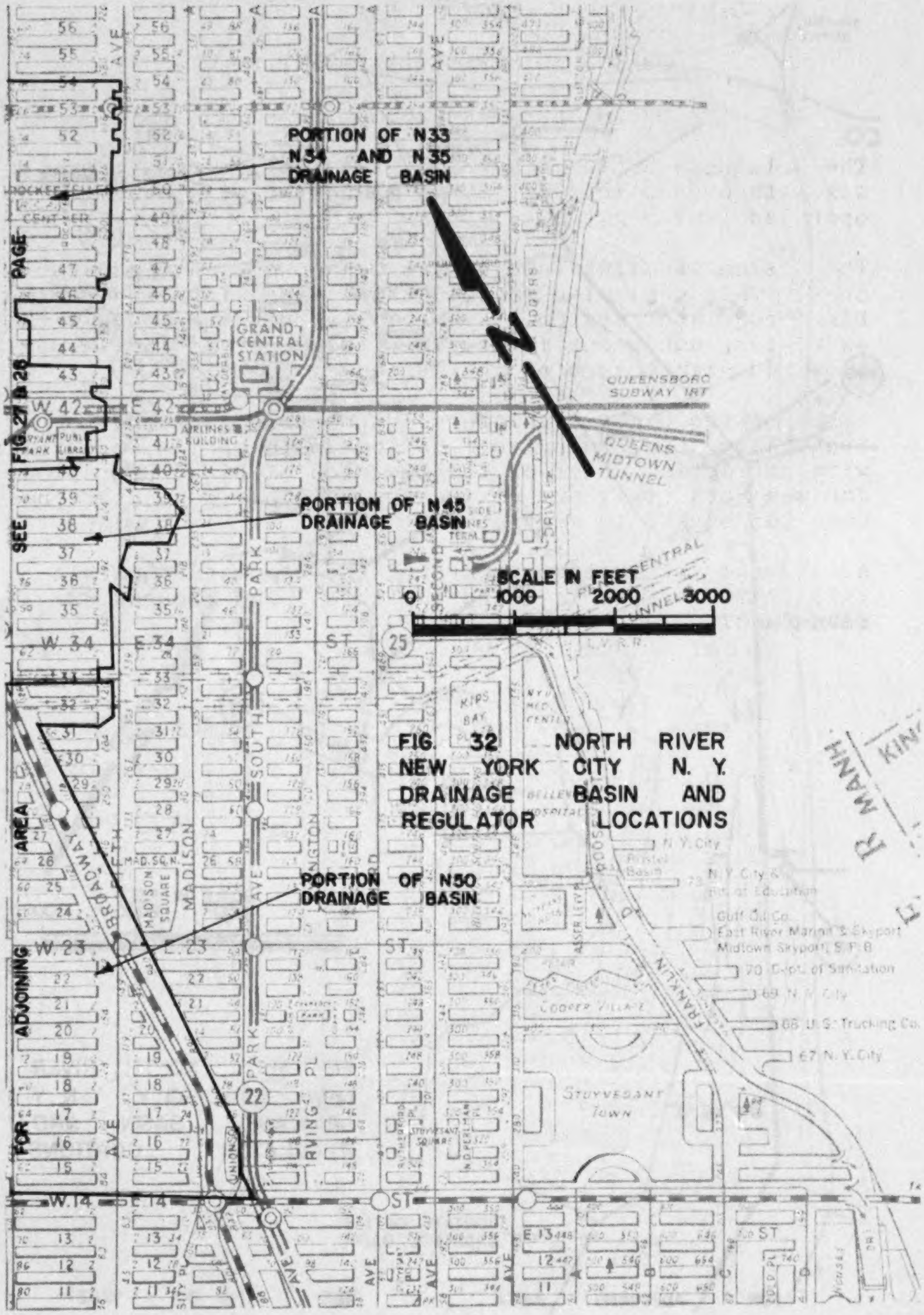

SPUYTEN DUYVIL STA
BAKER FIELD
CO.
INWOOD HILL
9A
N14
N13
N12
N15
N10
N9
N8
N7
N6
N5
N4
N3
N1
N16
N16a
N17
DIV. CHAMBERS
DIV. & T.G.
DIV. CHAMBER
DIV.
18"Ø
18"Ø
24"Ø
46"Ø
42"Ø
42"Ø
6'-6"X5'-0"
6'-6"X5'-0"
6'-6"X6'-0"
6'-6"X6'-0"
TWIN 6'-0"X7'-0"
FORT TRYON PARK
THE CLOISTERS
DYCKMAN HOUSES
NEW YORK UNIVERSITY
UNIVERSITY HTS
MORRIS H
HARLEM RIVER
BROADWAY
SEAMAN AV
ACADEMY
VERMILYEA
SHERMAN
NAGLE
ELLWOOD
FT. GEORGE AVE
FORT WASHINGTON
OVERLOOK TER
WASHINGTON BRIDGE
HIGH BRIDGE
SCALE IN FEET
0
1000
2000
3000
N
PORTION OF N18 DRAINAGE BASIN

FIG. 31 NORTH RIVER
NEW YORK CITY N.Y.
DRAINAGE BASIN AND
REGULATOR LOCATIONS

FOR ADJOINING AREA SEE FIG. 30 PAGE



PORTION OF N33 N34 AND N35 DRAINAGE BASIN
PORTION OF N45 DRAINAGE BASIN
PORTION OF N50 DRAINAGE BASIN
FOR ADJOINING AREA SEE FIG. 27 & 28 PAGE
N
SCALE IN FEET
0
1000
2000
3000
GRAND CENTRAL STATION
QUEENSBORO SUBWAY IRT
QUEENS MIDTOWN TUNNEL
W. 42
E. 42
W. 34
E. 34
W. 23
E. 23
W. 14
E. 14
ST
BROADWAY
MADISON
MADISON SQUARE
PARK AVE SOUTH
IRVING PL
25
22
KIPS BAY
STUYVESANT TOWN
COOPER VILLAGE
FRANKLIN D. ROOSEVELT DRIVE
N. Y. City
N. Y. City & Bd. of Education
Gulf Oil Co.
East River Marina & Skyport
Midtown Skyport, S. P. B.
70 Dept. of Sanitation
69 N. Y. City
68 U.S. Trucking Co.
67 N. Y. City

FIG. 32 NORTH RIVER NEW YORK CITY N. Y. DRAINAGE BASIN AND REGULATOR LOCATIONS

SECTION XII

OWLS HEAD SEWAGE TREATMENT PLANT

DRAINAGE BASIN, BROOKLYN, N. Y.

The Owls Head drainage basin contains eight regulators; six with hydraulic float systems and two with manually operated sluice gates.

The system is maintained by the Oakwood Beach regulator crew. This crew also maintains the Port Richmond Treatment Plant regulator system. A specially prepared truck with sufficient equipment is utilized to assist in the inspection and maintenance of the system.

Seven of the eight regulators inspected were found to be inoperable. According to a follow-up telephone conversation with the Acting Chief of the Division of Plant Operations for New York City, one of the non-operable regulators has been put back into service.

Additional information regarding the regulators within this drainage area is found in Table 7 and Figures 33 through 37.

TABLE 7 - OWLS HEAD TREATMENT PLANT DRAINAGE BASIN

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
1	92nd Street & Shore Parkway	Two 6'-0" x 4'-0" Sluice Gates with Independent Hydraulic Float Systems	2,700 (Combined Data For Regulators 1 & 9)	580,000	N/A	N/A	80	10	5	5	N/A	109.5
2	82nd Street East of Shore Parkway	16" x 16" Manually Operated Sluice Gate	93	N/A	N/A	N/A	95	0	0	5	N/A	N/A
3	79th Street East of Shore Parkway	2'-0" x 3'-0" Sluice Gate With Hydraulic Float System	513	85,000	N/A	N/A	85	10	0	5	N/A	15.6
4	71st Street East of Shore Parkway	1'-6" x 2'-0" Sluice Gate With Hydraulic Float System	159	20,000	N/A	N/A	90	10	0	0	N/A	3.8
5	69th Street & Shore Road	1'-4" x 1'-4" Manually Operated Sluice Gate	9	N/A	N/A	N/A	90	10	0	0	N/A	N/A
6	First Avenue & 64th Street	Two 5'-0" x 3'-0" Sluice Gates With Independent Hydraulic Float Systems	5,122 (Combined Data For Regulators 6, 8, 8-A, 8-B and 9-A)	697,500	N/A	N/A	70	15	10	5	N/A	128.7
7	First Avenue & 49th Street	5'-0" x 3'-0" Sluice Gate With Hydraulic Float System	1,836 (Combined Data For Regulators 7 Thru 7-D)	200,000	N/A	N/A	70	15	15	0	N/A	39.0

TABLE 7 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS: Interceptor Line: Upstream	Interceptor Line: Downstream	Trunk Line	By-Pass Line	Outfall	Receiving Waterway	INSPECTION DATA: Date	Operable (Yes or No)	Comments	Figure No. for Location of Regulator
1	--	96" ø Arch	11'-0" ø Brick	Three 7'-4" x 7'-4" Brick	Three 7'-4" x 7'-4" Brick	Upper New York Bay	11-4-71	No	Originally designed as a hydraulic regulator; however, all equipment and mechanical devices are missing. Regulator crew has built a weir at entrance to outfall line.	34
2	96" ø Arch	16" ø CI BR INT to 96" ø Arch	30" x 45" Brick	30" x 45" Brick	30" x 45" Brick	Upper New York Bay	11-4-71	No	Unable to move sluice gates due to rusted condition of equipment.	34
3	96" ø Arch	36" ø BR INT to 108" ø Arch	12'-0" x 7'-0" Brick Lined Conc	12'-0" x 7'-0" Brick Lined Conc	12'-0" x 7'-0" Brick Lined Conc	Upper New York Bay	11-4-71	No	Heavy water leakage from relief pressure valve on hydraulic system hookup. Tide gate leaking.	34
4	9'-0" Arch	24" ø CI INT BR to 9'-0" Arch	60" Oval Brick	60" Oval Brick	60" Oval Brick	Upper New York Bay	11-4-71	No	Needs maintenance and repair. City water supply leaking from elbow on hydraulic system hookup. Tide gate leaking slightly.	35
5	9'-0" Arch	9'-0" Arch	36" ø	36" ø	36" ø	Upper New York Bay	11-4-71	No	Unable to move sluice gates due to rusted condition of equipment. Tide gate in good condition.	35
6	6'-0" ø RC	9'-0" x 7'-0" RC BR INT to 12'-6" x 8'-0" RC	15'-0" ø Brick & 42" Brick Egg-shaped & 30" Brick Egg-shaped	Three 7'-6" Brick Arch	Three 7'-6" Brick Arch	Upper New York Bay	11-4-71	No	Hydraulic system does not operate because there is no City Water supply to operate system. Tide gates in good condition.	35
7	--	6'-0" ø RC	--	--	10'-0" ø Brick	Upper New York Bay	11-4-71	No	Four-way valve is missing (being repaired). Regulator gate is being held open. Seals on tide gate need repair.	35

TABLE 7 - OWLS HEAD TREATMENT PLANT DRAINAGE BASIN (Continued)

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
7-A	First Avenue & 49th Street	Diversion Chamber (Weir)	(See Regulator 7 For Combined Data)									
7-B	First Avenue & 49th Street	Diversion Chamber (Weir)	(See Regulator 7 For Combined Data)									
7-C	First Avenue & 49th Street	Diversion Chamber (Weir)	(See Regulator 7 For Combined Data)									
7-D	First Avenue & 43rd Street	Diversion Chamber (Weir)	(See Regulator 7 For Combined Data)									
8	Rogers Avenue & Martense Street	3'-0" x 2'-0" Sluice Gate With Hydraulic Float System	(See Regulator 6 For Combined Data)									
8-A	Flatbush & Bedford Avenues	Diversion Chamber	(See Regulator 6 For Combined Data)									
8-B	Foster Avenue & East 21st Street	Diversion Chamber	(See Regulator 6 For Combined Data)									
9	17th & Bath Avenues	Diversion Chamber (Weir)	(See Regulator 1 For Combined Data)									
9-A	17th Avenue & 60th Street	Diversion Chamber (Weir)	(See Regulator 6 For Combined Data)									

TABLE 7 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS: Interceptor Line: Upstream	Interceptor Line: Downstream	Trunk Line	By-Pass Line	Outfall	Receiving Waterway	INSPECTION DATA: Date	Operable (Yes or No)	Comments	Figure No. for Location of Regulator
7-A	--	--	9'-0" ø Brick	9'-0" ø Brick	10'-0" ø Brick	Upper New York Bay	--	--	--	-
7-B	--	--	60" Brick Egg-shaped	60" Brick Egg-shaped & 6'-0" ø RC	10'-0" ø Brick	Upper New York Bay	--	--	--	-
7-C	--	--	30" Brick Egg-shaped	30" Brick Egg-shaped & 4'-0" ø RC	10'-0" ø Brick	Upper New York Bay	--	--	--	-
7-D	--	--	9'-0" ø Brick	60" ø Brick	60" ø Brick	Upper New York Bay	11-4-71	Yes	Needs cleaning. No rungs in chamber -- need ladder for access.	35
8	--	--	8'-0" x 8'-6" RC & 24" ø VP	8'-0" x 8'-6" RC	--	--	11-4-71	Yes	Diversion chamber with regulator. If flow to Owls Head plant too great flow is diverted to Coney Island plant. Regulator has no direct discharge.	37
8-A	--	--	--	--	--	--	--	--	--	37
8-B	--	--	--	--	--	--	11-3-71	Yes	--	37
9	--	--	15'-0" ø	15'-0" ø	21"-0" ø	Gravesend Bay	11-3-71	Yes	--	34
9-A	--	--	--	--	--	--	11-3-71	Yes	--	33

TABLE 7 - OWLS HEAD TREATMENT PLANT DRAINAGE BASIN (Continued)

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
Avenue V Pump Station	Avenue V & 86th Street	--	1,666	N/A	N/A	N/A	55	20	20	5	N/A	N/A

NOTES FOR TABLE 7:

Regulator Data - taken from regulator detail sheets (1942) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Drainage Area Data - boundaries determined from Existing Sewer Line Maps of Brooklyn. Acreage calculated from the layout of the drainage area boundaries.

Population Data - from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (for the year 1970).

Land Use Data - estimated from Land Use Policy Maps in Plan for New York City, A Proposal-1969, Volume 3-Brooklyn prepared by the New York City Planning Commission.

Hydraulic Data - taken from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (for the year 1970).

TABLE 7 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
Avenue V Pump Station	--	24" ∅ CI Force Main & 30" ∅ CI Force Main	48" ∅ & 24" ∅ & 42" ∅ & Three 36" ∅	Two 36" ∅ CI	Two 36" ∅ CI	Coney Island Creek	11-3-71	Yes	Pump capacities: 2 @ 3500 GPM 1 @ 5000 GPM; 1 @ 6000 GPM 1 @ 9000 GPM; 3 @ 11,000 GPM	33

NOTES FOR TABLE 7 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Existing Sewer Line Maps of Brooklyn.

Inspection Data - according to telephone conversation on June 2, 1972 with the Acting Chief of the Division of Plant Operations, New York Environmental Protection Administration, Division of Water Resources and Water Pollution Control, regulator 7 has been placed into operable condition.

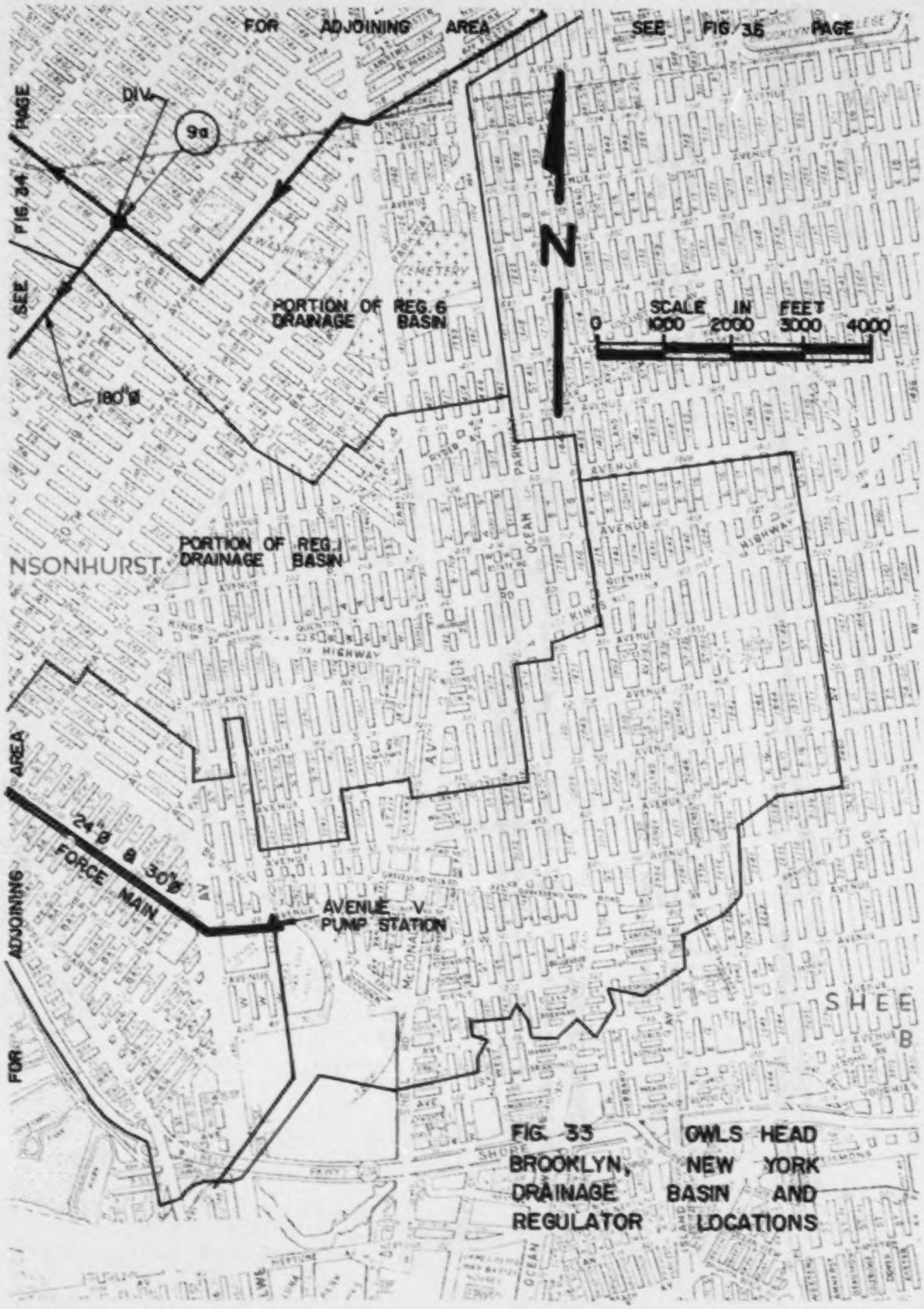

FOR ADJOINING AREA SEE FIG. 35 PAGE
SEE FIG. 34 PAGE
DIV.
9a
N
SCALE IN FEET
0
1000
2000
3000
4000
PORTION OF REG. 6 DRAINAGE BASIN
CEMETERY
180"Ø
PORTION OF REG. 1 DRAINAGE BASIN
NSONHURST
24"Ø & 30"Ø FORCE MAIN
AVENUE V PUMP STATION
FOR ADJOINING AREA
SHEE
B

FIG. 33 OWLS HEAD BROOKLYN, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS

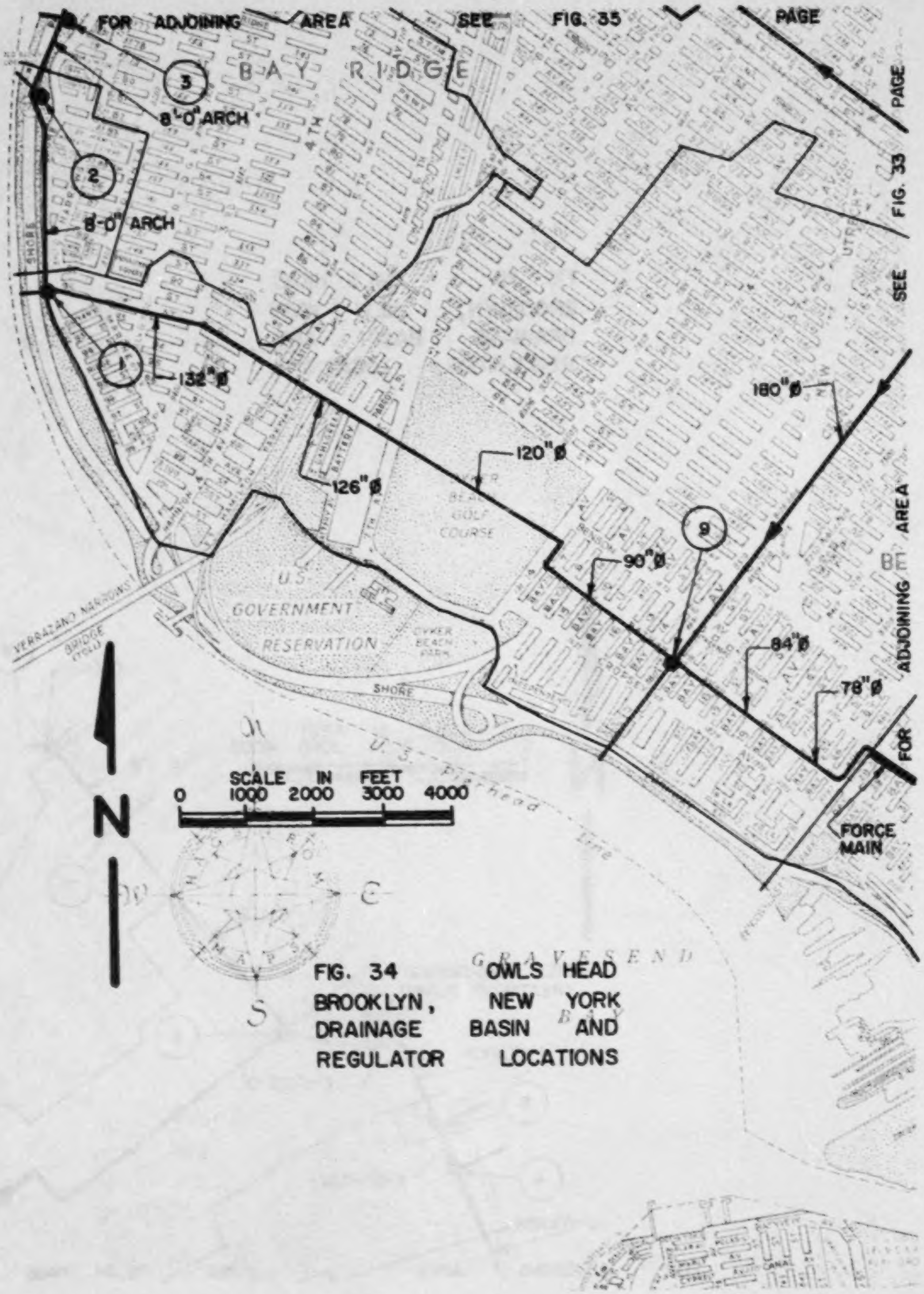

FOR ADJOINING AREA SEE FIG. 35 PAGE
SEE FIG. 33 PAGE
FOR ADJOINING AREA
BAY RIDGE
3
2
1
9
8'-0" ARCH
8'-0" ARCH
132"Ø
126"Ø
120"Ø
90"Ø
84"Ø
78"Ø
180"Ø
FORCE MAIN
GOLF COURSE
U.S. GOVERNMENT RESERVATION
SHORE
VERRAZANO NARROWS BRIDGE
U.S. Pierhead Line
GRAVESEND BAY
SCALE IN FEET
0
1000
2000
3000
4000
N

FIG. 34 OWLS HEAD
BROOKLYN, NEW YORK
DRAINAGE BASIN AND
REGULATOR LOCATIONS

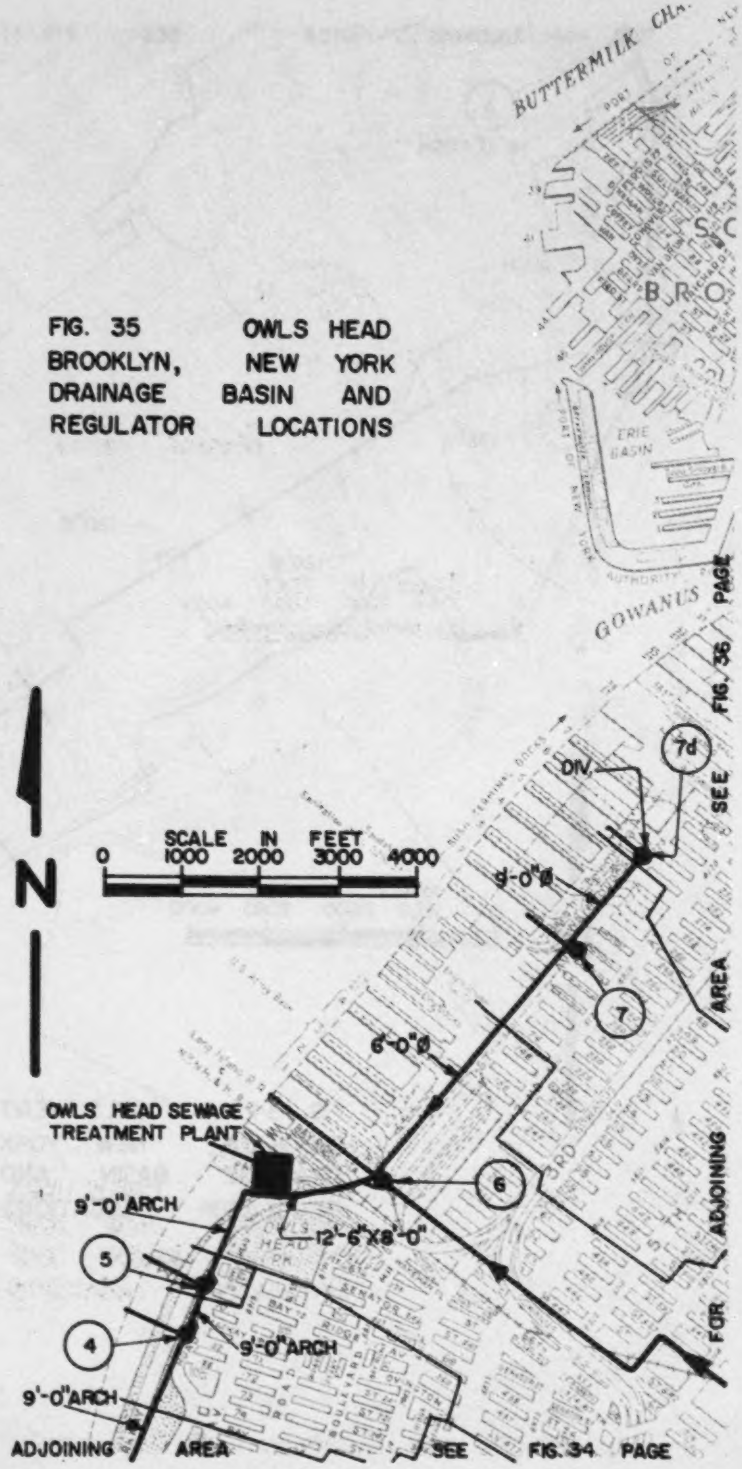

BUTTERMILK CHA
ERIE BASIN
GOWANUS
N
SCALE IN FEET
0
1000
2000
3000
4000
DIV.
7d
9'-0"Ø
7
6'-0"Ø
OWLS HEAD SEWAGE TREATMENT PLANT
6
9'-0"ARCH
12'-6"X8'-0"
5
4
9'-0"ARCH
9'-0"ARCH
FOR ADJOINING AREA SEE FIG. 34 PAGE
FOR ADJOINING AREA SEE FIG. 36 PAGE

FIG. 35 OWLS HEAD
BROOKLYN, NEW YORK
DRAINAGE BASIN AND
REGULATOR LOCATIONS

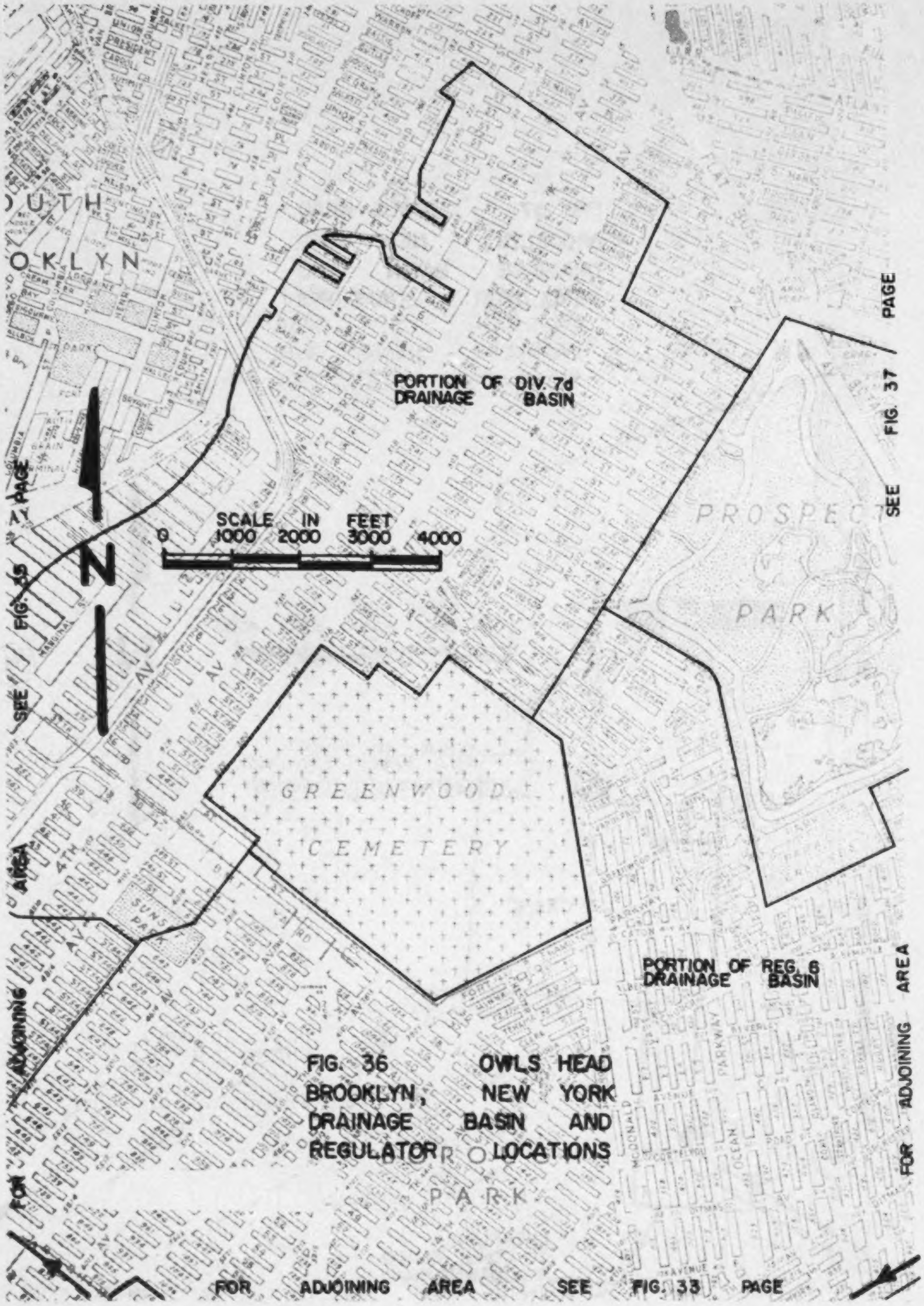
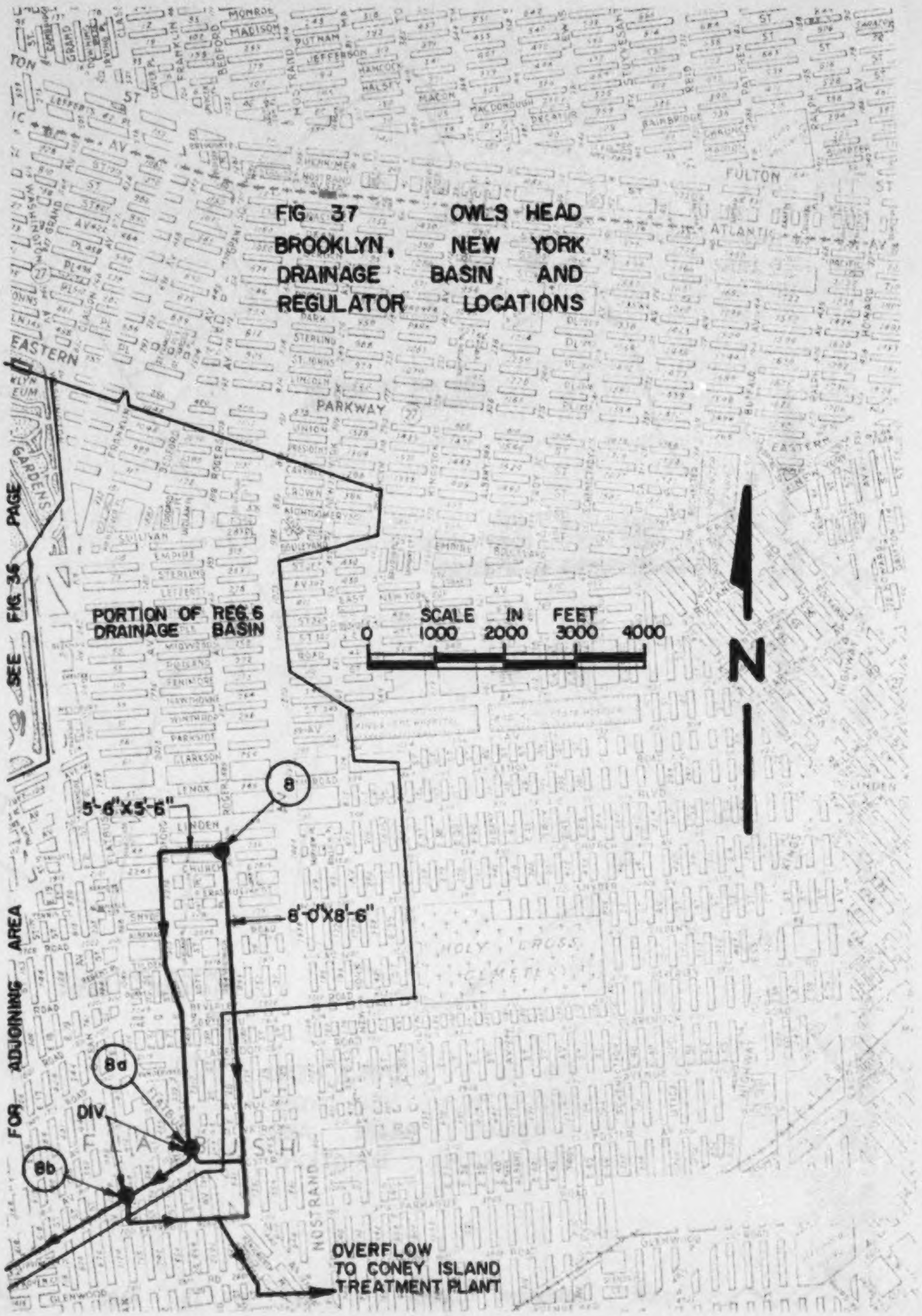

OUTH
OKLYN
PORTION OF DIV. 7d DRAINAGE BASIN
SCALE IN FEET
0 1000 2000 3000 4000
N
PROSPECT
PARK
GREENWOOD
CEMETERY
4TH AV
PORTION OF REG. 6 DRAINAGE BASIN
BORO
PARK
FOR ADJOINING AREA SEE FIG. 35 PAGE
FOR ADJOINING AREA SEE FIG. 37 PAGE
FOR ADJOINING AREA SEE FIG. 33 PAGE

FIG. 36 OWLS HEAD BROOKLYN, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS



SEE FIG. 36 PAGE
FOR ADJOINING AREA
PORTION OF REG. 6
DRAINAGE BASIN
SCALE IN FEET
0
1000
2000
3000
4000
N
8
5'-6"X5'-6"
8'-0"X8'-6"
8a
8b
DIV
OVERFLOW
TO CONEY ISLAND
TREATMENT PLANT
EASTERN
PARKWAY
FULTON
ATLANTIC
HOLY CROSS CEMETERY
FLATBUSH
NOSTRAND
LINDEN
CHURCH
GLENWOOD

FIG. 37 OWLS HEAD
BROOKLYN, NEW YORK
DRAINAGE BASIN AND
REGULATOR LOCATIONS

SECTION XIII

PORT RICHMOND SEWAGE TREATMENT
DRAINAGE BASIN, STATEN ISLAND, N.Y.

The Port Richmond drainage system contains forty-three regulators. Nine of these regulators have been placed into service - the others are either under construction or proposed. The nine existing regulators consist of three hydraulically operated types, one mechanical float type, three manually operated types and two weir types.

Three of the nine regulators inspected were found to be inoperable. According to a follow-up telephone conversation with the Acting Chief of the Division of Plant Operations for New York City, two of these regulators have been placed into an operable condition and one is being repaired.

The system is maintained by the Oakwood Beach regulator crew. A specially equipped truck is utilized to assist crews in the inspection and maintenance of the system.

Additional information regarding the regulators within this drainage area is found in Table 8 and Figures 38 through 43.

TABLE 8 - PORT RICHMOND TREATMENT PLANT DRAINAGE BASIN

STATEN ISLAND, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Translent	Res.	Com.	Ind.	Oth.		
R-1 (Contract 2)	Richmond Terrace West of Holland Avenue	12" ∅ Manually Operated Shear Gate	208	400	0	N/A	30	0	40	30	0.186	5.053
R 2 (Contract 2)	Richmond Terrace and South Avenue	12" ∅ Manually Operated Shear Gate	20	300	0	N/A	80	0	20	0	0.104	5.317
R-3 (Contract 2)	Harbor Road North of Richmond Terrace	24" x 12" Sluice Gate With Hydraulic Float System	435	10,700	500	N/A	70	5	10	15	3.673	36.735
R-4 (Contract 2)	Union Avenue North of Richmond Terrace	12" ∅ Manually Operated Shear Gate	45	900	400	N/A	90	0	10	0	0.310	37.665
R-5 (Contract 2)	Richmond Terrace & Housman Avenue	1'-0" x 1'-0" Sluice Gate With Hydraulic Float System	132	2,100	600	N/A	60	0	40	0	1.628	41.385
R 6 (Contract 2)	Richmond Terrace & Nicholas Avenue	30" x 24" Sluice Gate With Hydraulic Float System	1,932	23,600	2,200	N/A	75	0	10	15	6.153	69.130
R-1 (Contract 4-A)	Nautilus Court North of Cliff Street	1'-0" x 1' 0" Sluice Gate With Hydraulic Float System	476	5,900	400	300	52	0	6	42	1.352	10.193

(Combined Data for Regulators R-1, R-2 & R-3 (Contract 4-A))

TABLE 8 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
R-1 (Cont. 2)	18" ø VP	24" ø VP	Two 12" ø VP	15" ø VP	15" ø VP	Newark Bay	12-3-71	Yes	Tide gate leaking	41
R-2 (Cont. 2)	24" ø VF	12" ø VP BR INT To 24" ø VP	8" ø VP	8" ø VP	10" ø CI	Newark Bay	12-3-71	Yes	--	41
R-3 (Cont. 2)	42" ø PRCP	30" ø RC BR INT To 54" ø PRCP	52" ø CONC & 15" ø VP	52" ø CONC & 15" ø VP	52" ø CONC & 15" ø VP	Newark Bay	12-3-71	No	Blockage in return line to interceptor has caused closing of sluice gate and overflow to bay.	41
R-4 (Cont. 2)	54" ø PRCP	15" ø VP BR INT to 60" ø PRCP	37" X 62" SEMI-CIRC RC & 12" ø VP	37" X 62" SEMI-CIRC RC & 12" ø VP	37" X 62" SEMI-CIRC RC & 12" ø VP	Newark Bay	12-3-71	Yes	--	41
3-5 (Cont. 2)	60" ø RC	60" ø RC	12" ø & TWIN 71 1/2" X 33" RC	TWIN 71 1/2" X 33" RC	TWIN 71 1/2" X 33" RC	Newark Bay	12-3-71	No	Piston for hydraulic apparatus missing - was defective - Gate being kept in open position - Maximum flow to plant. Tide gate leaking.	41
R-6 (Cont. 2)	60" ø RC	54" ø RC	TWIN 104" X 60" FTRC	TWIN 104" X 60" FTRC	TWIN 104" X 60" FTRC	Kill Van Kull	12-3-71	Yes	--	40
R-1 (Cont. 4-A)	--	12" ø VP BR INT	6'-6"X 5'-11" SEMI-CIRC FTRC & 36" ø PRCP	7'-6" X 5'-0" RC with SEMI-CIRC NOTCH	7'-6"X 5'-11" with SEMI-CIRC NOTCH	Upper New York Bay	--	--	To be constructed	38

TABLE 8 - PORT RICHMOND TREATMENT PLANT DRAINAGE BASIN (Continued)

STATEN ISLAND, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-2 (Contract 4-A)	Nautilus Court North of Cliff Street	----	(SEE REGULATOR R-1 (CONTRACT 4-A) FOR COMBINED DATA)									
R-3 (Contract 4-A)	Nautilus Street East of Bay Street	1'-0" X 2'-0" Sluice Gate with Hydraulic Float System	(SEE REGULATOR R-1 (CONTRACT 4-A) FOR COMBINED DATA)									
R-4 (Contract 4-A)	Hylan Boulevard & Edgewater Street	12" ø Manually Operated Shear Gate	9	100	0	0	100	0	0	0	0.026	10.475
R 5 (Contract 4-A)	Edgewater Street North of Sylva Lane	12" ø Manually Operated Shear Gate with Provisions for Future Hydraulic Float System	18	200	100	100	13	0	87	0	0.071	10.751
R-6 (Contract 4-A)	Edgewater Street North of Sylvaton Terrace	12" ø Manually Operated Shear Gate with Provisions for Future Hydraulic Float System	2	0	N/A	N/A	0	0	100	0	0.003	10.758
R-7	Lynhurst Avenue & Edgewater Street	2'-0" X 1'-0" Sluice Gate with Hydraulic Float System	326	5,900	200	100	67	0	17	16	2.213	17.288
R-8	Edgewater Street North of Camden Street	12" ø Manually Operated Shear Gate	50	600	0	100	39	0	61	0	0.197	18.372

TABLE 8 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS Interceptor Line Upstream	 Downstream	 Trunk Line	 By-Pass Line	 Outfall	Receiving Waterway	INSPECTION DATA Date	 Operable (Yes or No)	 Comments	Figure No. for Location of Regulator
R-2 (CONT. 4-A)	12" ø VP BR INT	12" ø DI BR INT	--	--	--	--	--	--	To Be Constructed	38
R-3 (CONT. 4-A)	--	30" ø PRCP	6'-4" ø RC & 12" ø VP	6'-4" ø RC	--	--	--	--	To Be Constructed	38
R-4 (CONT. 4-A)	30" ø PRCP	30" ø PRCP	10" ø VP & 12" ø	10" ø VP	10" ø VP	Upper New York Bay	--	--	To Be Constructed	38
R-5 (CONT. 4-A)	30" ø PRCP	30" ø PRCP	18" ø VP & 15" ø VP	15" ø VP	18" ø VP	Upper New York Bay	--	--	To Be Constructed	38
R-6 (CONT. 4-A)	30" ø PRCP	12"ø BR INT To 30" ø PRCP	12" ø VP	16" ø VP	16" ø VP	Upper New York Bay	--	--	To Be Constructed	39
R-7	30" ø PRCP	24" ø BR INT To 36" ø PRCP	TWIN 3'-6" x 6'-4" RC 20" ø VP & 12" ø VP	TWIN 3'-6" x 6'-4" RC	TWIN 3'-6" x 6'-4" RC	Upper New York Bay	--	--	To Be Constructed	39
R-8	36" ø PRCP	42" ø PRCP	TWO 18" ø VP & 24" ø PRCP	36" ø PRCP	36" ø PRCP	Upper New York Bay	--	--	To Be Constructed	39

TABLE 8 - PORT RICHMOND TREATMENT PLANT DRAINAGE BASIN (Continued)

STATEN ISLAND, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-9	Stapleton Terminal East of Norwood Avenue	1'-0" X 1'-0" Sluice Gate with Hydraulic Float System	72	1,100	100	100	83	0	17	0	0.325	21.554
R-10	Stapleton Terminal East of United States Marine Hospital	12" ø Manually Operated Shear Gate with Provisions for Future Hydraulic System	992 (Combined Data For Regulators R-10, R-11, R-12 & R-13)	12,200	4,800	3,200	81	3	0	16	3.206	52.212
R-11	Stapleton Terminal East of Dock Street	12" ø Manually Operated Shear Gate with Provisions for Future Hydraulic System										
R-12	Thompson Street West of Front Street	12" ø Manually Operated Shear Gate										
R-13	Canal Street West of Front Street	2'-6" X 2'-6" Sluice Gate With Hydraulic Float System										
R-14	Water Street West of Front Street	12" ø Manually Operated Shear Gate	43	200	100	100	24	69	7	0	0.063	52.532

TABLE 8 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
R-9	42" ø PRCP	18" ø BR INT To 42" ø PRCP	48" ø PRCP	48" ø PRCP	48" ø PRCP	Upper New York Bay	--	--	To Be Constructed	39
R-10	42" ø PRCP	12" ø VP BR INT To 42" ø PRCP	16" ø VP	16" ø VP	16" ø VP	Upper New York Bay	--	--	To Be Constructed	39
R-11	42" ø PRCP	12" ø VP BR INT To 42" ø PRCP	3'-6" X 2'-4" BRICK EGG-SHAPED	3'-6" X 2'-4" BRICK EGG-SHAPED	3'-6" X 2'-4" BRICK EGG-SHAPED	Upper New York Bay	--	--	To Be Constructed	39
R-12	42" ø PRCP	12" ø BR INT To 42" ø PRCP	N/A	10" ø To R-13	--	--	--	--	To Be Constructed	39
R-13	42" ø PRCP	60" ø PRCP	TWIN 4'-0" X 9'-5" RC & 36" ø & 12" ø VP & 15" ø VP	TWIN 4'-0" X 9'-5" RC & 36" ø	TWIN 4'-0" X 9'-5" RC & 36" ø	Upper New York Bay	--	--	To Be Constructed	39
R-14	60" ø PRCP	12" ø BR INT To 60" ø PRCP	N/A	15" ø To R-13	--	--	--	--	To Be Constructed	39

TABLE 8 - PORT RICHMOND TREATMENT PLANT DRAINAGE BASIN (Continued)

STATEN ISLAND, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-15	Stapleton Terminal East of Baltic Street	1'0"x1'-0" Sluice Gate with Hydraulic Float System	239	3,300	100	100	57	0	43	0	1.006	56.620
R-16	Murray Hulbert Avenue South of Victory Boulevard	2'-6"x2'-6" Sluice Gate with Hydraulic Float System	464	13,000	1,700	1,500	84	4	6	6	3.237	76.544
R-17	Victory Boulevard East of Murray Hulbert Avenue	---	2	0	N/A	N/A	0	35	65	0	0.002	76.602
R-18	Hamilton Avenue & Richmond Terrace	18"x12" Sluice Gate with Hydraulic Float System	36	1,500	1,500	1,000	32	68	0	0	0.379	80.520
R-19	Saint Peters Place & Richmond Terrace	18"x12" Sluice Gate with Hydraulic Float System	61	3,200	3,100	2,100	92	0	0	8	0.805	86.600
R-20	Jersey Street & Richmond Terrace	18"x18" Sluice Gate with Hydraulic Float System	138	7,300	0	0	93	0	7	0	1.662	91.938
R-21	Franklin Avenue & Richmond Terrace	Diversion Chamber (Weir)	33	900	0	0	76	0	24	0	0.231	92.884
R-22	Lafayette Avenue & Richmond Terrace	12" ∅ Shear Gate with Hydraulic Float System	46	1,500	0	0	79	0	21	0	0.351	94.442

TABLE 8 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS: Interceptor Line: Upstream	Interceptor Line: Downstream	Trunk Line	By-Pass Line	Outfall	Receiving Waterway	INSPECTION DATA: Date	Operable (Yes or No)	Comments	Figure No. for Location of Regulator
R-15	60" ø PRCP	66" ø PRCP	TWIN 6'-2" X 3'-6" RC & 15" ø VP	TWIN 6'-2" X 3'-6" RC & 15" ø VP	TWIN 6'-2" X 3'-6" RC & 15" ø VP	Upper New York Bay	--	--	To Be Constructed	39
R-16	36" ø PRCP	36" ø PRCP	2'-0" ø RC & 12" ø VP	2'-0" ø RC	2'-0" ø RC	Upper New York Bay	--	--	To Be Constructed	39
R-17	--	36" ø PRCP	72" ø BRICK	72" ø BRICK	72" ø BRICK	Upper New York Bay	--	--	To Be Constructed	39
R-18	78" ø	24" ø PRCP BR INT To 78" ø	15" ø VP & 24" ø PRCP	30" ø	1'-10" x 2'-9"	Upper New York	--	--	Under Construction	39
R-19	78" ø	24" ø PRCP BR INT To 78" ø	30" ø CI	30" ø CI	30" ø CI	Upper New York Bay	--	--	Under Construction	39
R-20	78" ø	36" ø PRCP BR INT To 78" ø	4'-6"X 6'-0" FTRC	4'-6"X 6'-0" FTRC	4'-6"X 6'-0" FTRC	Kill Van Kull	--	--	Under Construction	39
R-21	78" ø	15" ø BR INT To 78" ø	6" ø	6" ø	6" ø	Kill Van Kull	--	--	Under Construction	39
R-22	78" ø	12" ø VP BR INT To 78" ø	24" ø VP	24" ø VP	24" ø VP	Kill Van Kull	--	--	Under Construction	39

TABLE 8 - PORT RICHMOND TREATMENT PLANT DRAINAGE BASIN (Continued)

STATEN ISLAND, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-23	Richmond Terrace & Clinton Avenue	12" ø Shear Gate With Hydraulic Float System	72	1,300	200	200	48	0	10	42	0.322	96.062
R-24	Tysen Street & Richmond Terrace	Diversion Chamber (Weir)	20	700	0	0	68	0	8	24	0.152	96.676
R-25	Richmond Terrace West of Tysen Street	Diversion Chamber (Weir)	8	100	N/A	N/A	100	0	0	0	0.039	96.958
R-26	Richmond Terrace West of Tysen Street	Diversion Chamber (Weir)	12	100	100	100	100	0	0	0	0.051	97.186
R-27	Richmond Terrace & Sailors Snug Harbor	18" x 12" Sluice Gate With Hydraulic Float System	33	100	N/A	N/A	100	0	0	0	0.071	97.406
R-28	Kissel Avenue & Richmond Terrace	18" x 12" Sluice Gate With Hydraulic Float System	292	5,200	700	500	88	0	0	12	1.418	103.732
R-29	Bard Avenue & Richmond Terrace	12" ø Shear Gate With Hydraulic Float System	125	3,200	0	0	91	0	5	4	0.801	106.796
R-30	Davis Avenue & Richmond Terrace	Diversion Chamber (Weir)	72	1,700	0	0	96	0	4	0	0.433	108.794

TABLE 8 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall					
	Upstream	Downstream					Date	Operable (Yes or No)	Comments	
R-23	78" ø	78" ø	36" ø BRICK	36" ø BRICK	36" ø BRICK	Kill Van Kull	--	--	Under Construction	40
R-24	--	18" ø VP BR INT To R-25	20" ø	20" ø	20" ø	Kill Van Kull	--	--	Under Construction	40
R-25	--	18" ø VP BR INT To R-26	15" ø	15" ø	15" ø	Kill Van Kull	--	--	Under Construction	40
R-26	--	18" ø VP BR INT To R-27	24" ø	24" ø	24" ø	Kill Van Kull	--	--	Under Construction	40
R-27	78" ø	24" ø	15" ø	18" ø VP BR INT From R-26 & 15" ø	15" ø	Kill Van Kull	--	--	Under Construction	40
R-28	78" ø	24" ø	20" ø	20" ø CI	20" ø CI	Kill Van Kull	--	--	Under Construction	40
R-29	78" ø	18" ø VP BR INT To 78" ø	8" ø VP & 18" ø VP	18" ø VP	18" ø VP	Kill Van Kull	--	--	Under Construction	40
R-30	--	24" ø BR INT To 78" ø	21" ø	12" ø	12" ø	Kill Van Kull	--	--	Under Construction	40

TABLE 8 - PORT RICHMOND TREATMENT PLANT DRAINAGE BASIN (Continued)

STATEN ISLAND, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-31	Elizabeth Avenue & Richmond Terrace	12" ø Shear Gate With Hydraulic Float System	5	100	0	0	82	0	18	0	0.028	109.510
R-32	Dement Avenue & Richmond Terrace	12" ø Shear Gate With Hydraulic Float System	206	5,200	100	0	98	0	2	0	1.312	114.650
R-33	Broadway & Richmond Terrace	12" x 12" Sluice Gate With Hydraulic Float System	178	4,700	100	100	87	0	13	0	1.187	119.418
R-34	Richmond Terrace East of Taylor Street	18" x 18" Sluice Gate With Hydraulic Float System	177	6,200	N/A	N/A	86	6	8	0	1.471	125.312
R-35	Bodine Street & Richmond Terrace	21" x 40 3/4" Sluice Gate With Mechanical Float System	1,575 (Combined Data for Regulators R-35, R-36 & R-37)	N/A	N/A	N/A	65	5	10	20	N/A	N/A
R-36	Rector Street & Richmond Terrace	Diversion Chamber (Weir) & Tidegate Chamber										
R-37	Richmond Avenue North of Richmond Terrace	Diversion Chamber (Weir)										

TABLE 8 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
R-31	78" ø	12" ø VP BR INT To 84" ø	12" ø VP Inside 36" ø CONC	12" ø VP Inside 36" ø CONC	12" ø VP Inside 36" ø CONC	Kill Van Kull	--	--	Under Construction	40
R-32	84" ø	18" ø VP BR INT To 84" ø	12" ø VP	12" ø VP	12" ø VP	Kill Van Kull	--	--	Under Construction	40
R-33	84" ø	24" ø PRCP BR INT To 84" ø	6" ø CI & 15" ø VP	15" ø VP	15" ø VP	Kill Van Kull	--	--	Under Construction	40
R-34	84" ø	18" ø DROP LINE To 84" ø	12" ø VP & 18" ø VP	18" ø VP	20" ø	Kill Van Kull	--	--	Under Construction	40
R-35	72" ø	72" ø	16" ø CI	16" ø CI	16" ø CI	Kill Van Kull	11-29-71	Yes	--	40
R-36	54" ø	72" ø	36" ø	4'-0" x 9'-0"	4'0" x 9'-0"	Kill Van Kull	11-29-71	Yes	--	40
R-37	54" ø	15" ø BR INT To 54" ø	TWIN 16" ø CI	TWIN 16" ø CI	TWIN 16" ø CI	Kill Van Kull	11-29-71	No	Grit and debris blocking flow to interceptor	40

TABLE 8 - PORT RICHMOND TREATMENT PLANT DRAINAGE BASIN (Continued)

STATEN ISLAND, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		

NOTES FOR TABLE 8:

Regulator Data - taken from regulator detail sheets (for regulators R-1 (Contract 2) through R-6 (Contract 2): 1966; for regulator R-1 (Contract 4-A) through R-6 (Contract 4-A) and regulators R-7 through R-34: 1970; for regulators R-35 through R-38: 1950) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Drainage Area Data - boundaries and acreage taken from maps and data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Population Data - from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (for regulators R-1 (Contract 2) through R-6 (Contract 2): for the year 1960; for the remaining regulators: for the year 1965).

Land Use Data - for regulators R-1 (Contract 2) through R-6 (Contract 2): estimated from Land Use Policy Maps in Plan for New York City, A Proposal-1969, Volume 6-Staten Island prepared by the New York City Planning Commission.
for the remaining regulators: calculated from data (1966) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Hydraulic Data - taken from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (for the year 1965).

TABLE 8 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								

NOTES FOR TABLE 8 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Existing Sewer Line Maps of Staten Island.

Inspection Data - according to telephone conversation on June 2, 1972 with the Acting Chief of the Division of Plant Operations, New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control, regulator R-5 (Contract 2) and R-37 have been placed into operable condition and regulator R-3 (Contract 2) is being repaired.

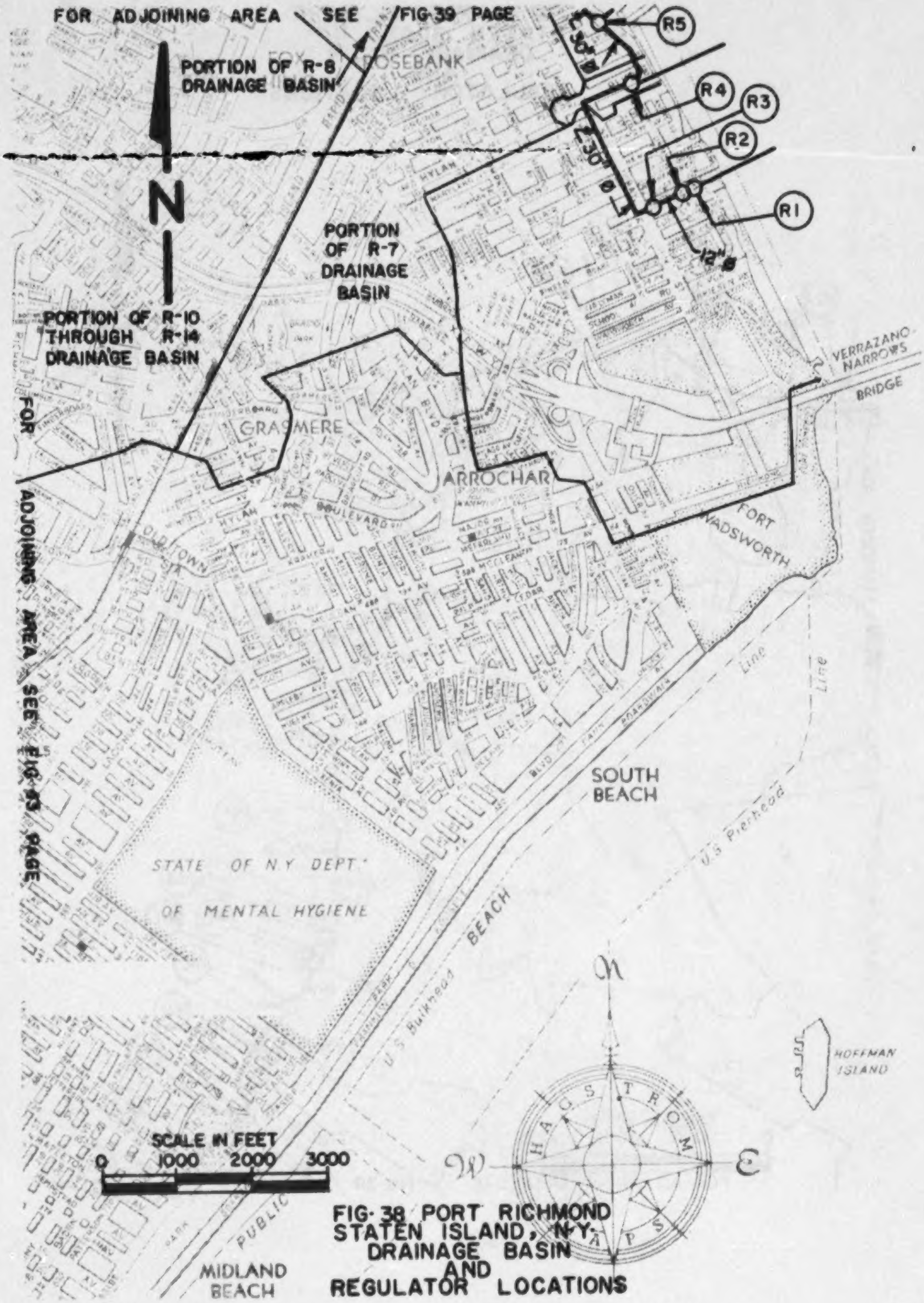

FOR ADJOINING AREA SEE FIG 39 PAGE
PORTION OF R-8 DRAINAGE BASIN
ROSEBANK
R5
R4
R3
R2
R1
12"
PORTION OF R-7 DRAINAGE BASIN
PORTION OF R-10 THROUGH R-14 DRAINAGE BASIN
N
VERRAZANO-NARROWS BRIDGE
GRASMERE
ARROCHAR
FORT WADSWORTH
FOR ADJOINING AREA SEE FIG 43 PAGE
SOUTH BEACH
STATE OF N.Y. DEPT. OF MENTAL HYGIENE
U.S. Pierhead Line
U.S. Bulkhead Line
BEACH
PUBLIC
MIDLAND BEACH
HOFFMAN ISLAND
SCALE IN FEET
0 1000 2000 3000
N
W
E
S
HAGSTROM MAPS

FIG. 38 PORT RICHMOND STATEN ISLAND, N.Y. DRAINAGE BASIN AND REGULATOR LOCATIONS

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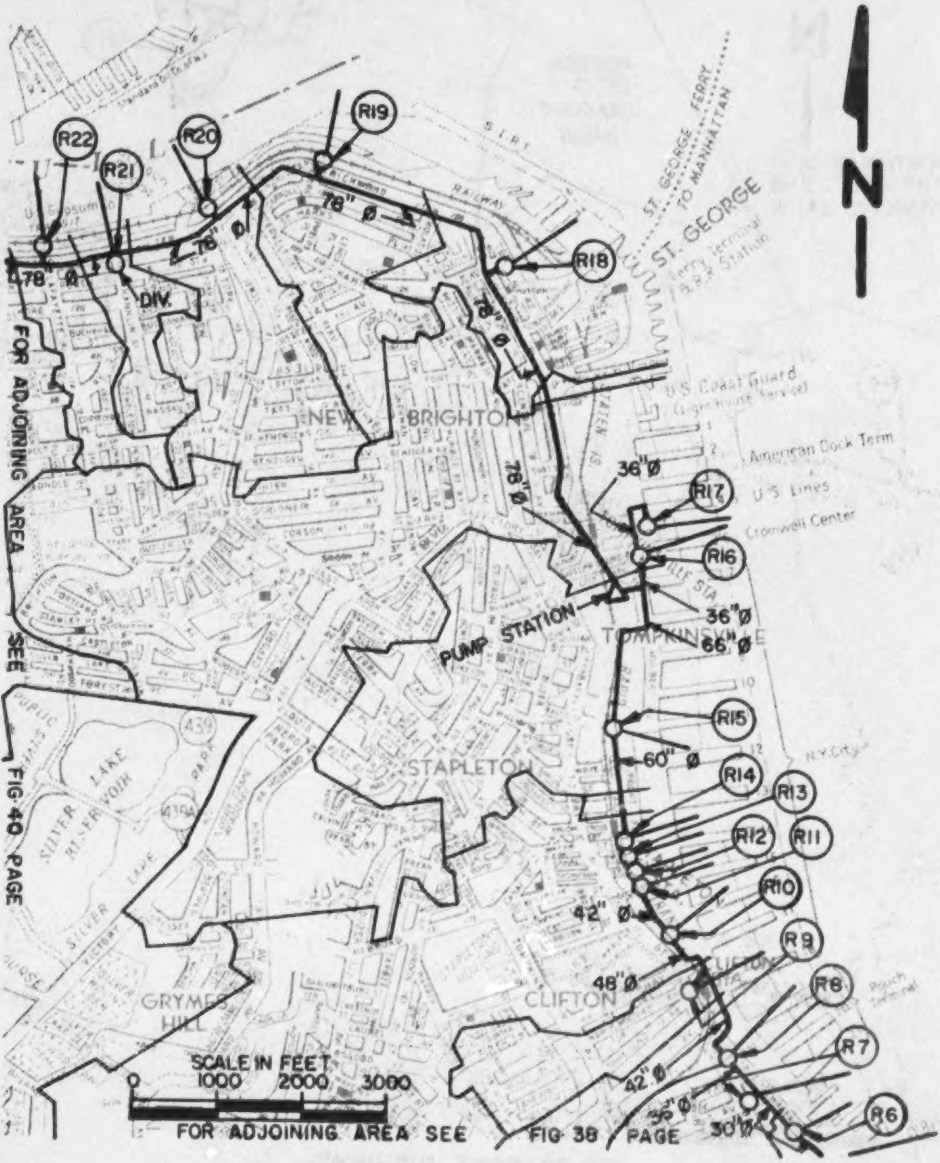
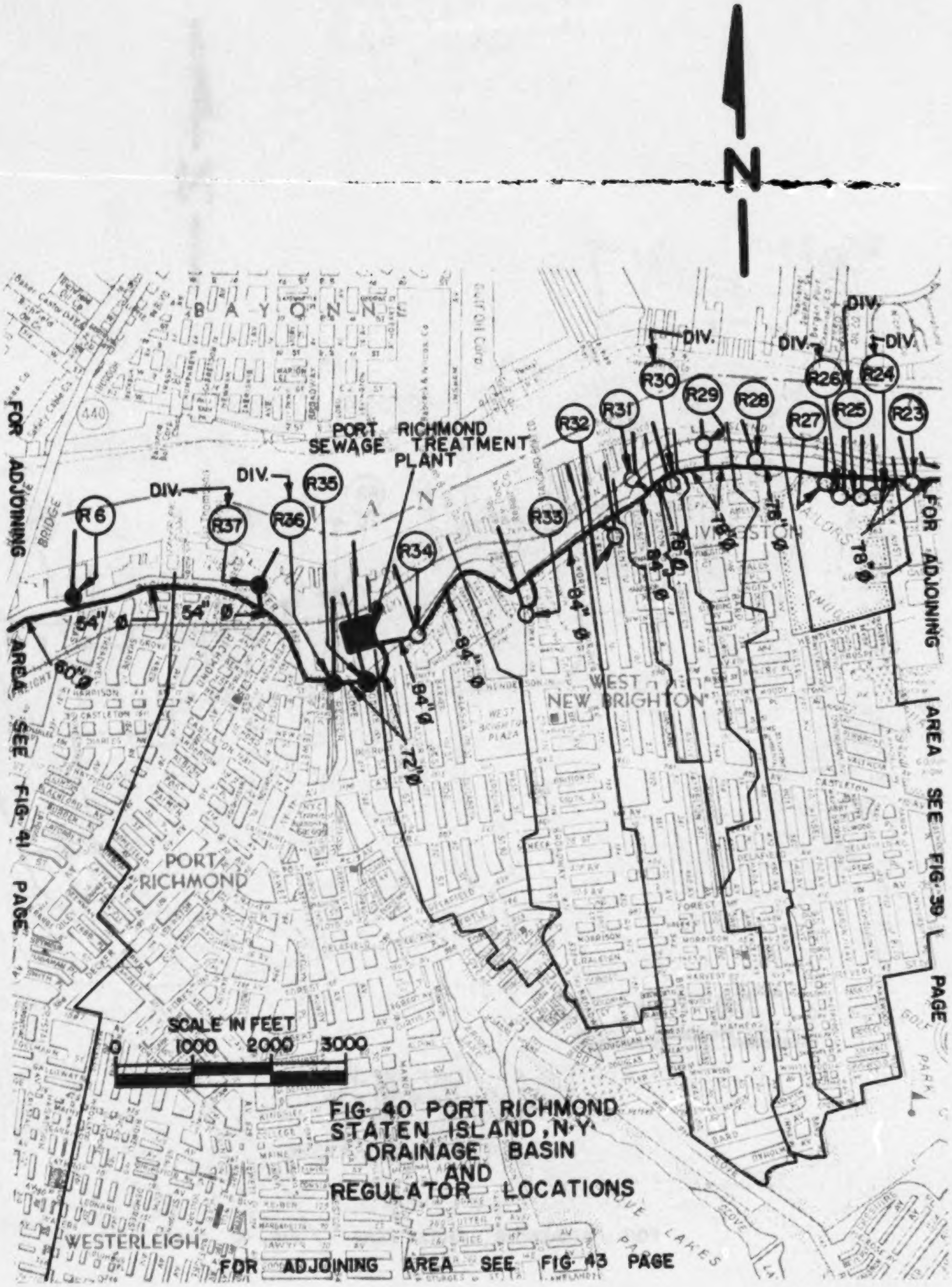
FIG. 39 PORT RICHMOND
STATEN ISLAND, N.Y.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS


R22
R21
R20
R19
R18
R17
R16
R15
R14
R13
R12
R11
R10
R9
R8
R7
R6
78" Ø
78" Ø
78" Ø
78" Ø
78" Ø
76" Ø
36" Ø
36" Ø
66" Ø
60" Ø
42" Ø
48" Ø
42" Ø
36" Ø
30" Ø
DIV.
PUMP STATION
ST. GEORGE FERRY TO MANHATTAN
ST. GEORGE
Ferry Terminal R.R. Station
U.S. Coast Guard (Lighthouse Service)
American Dock Term.
U.S. Lines
Cromwell Center
NEW BRIGHTON
TOMPKINSVILLE
STAPLETON
CLIFTON
GRYMES HILL
SILVER LAKE RESERVOIR
RICHMOND RAILWAY
S.I.R.T.
N
SCALE IN FEET
0
1000
2000
3000
FOR ADJOINING AREA SEE FIG 40 PAGE
FOR ADJOINING AREA SEE FIG 38 PAGE


N
BAYONNE
DIV.
DIV.
DIV.
DIV.
DIV.
DIV.
R6
R37
R36
R35
R34
R33
R32
R31
R30
R29
R28
R27
R26
R25
R24
R23
PORT RICHMOND SEWAGE TREATMENT PLANT
54" Ø
54" Ø
60" Ø
84" Ø
84" Ø
84" Ø
84" Ø
84" Ø
72" Ø
78" Ø
78" Ø
78" Ø
78" Ø
LIVINGSTON
WEST NEW BRIGHTON
WEST BRIGHTON PLAZA
PORT RICHMOND
WESTERLEIGH
SCALE IN FEET
0
1000
2000
3000
FOR ADJOINING AREA SEE FIG 41 PAGE
FOR ADJOINING AREA SEE FIG 39 PAGE
FOR ADJOINING AREA SEE FIG 43 PAGE

FIG· 40 PORT RICHMOND
STATEN ISLAND, N·Y·
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

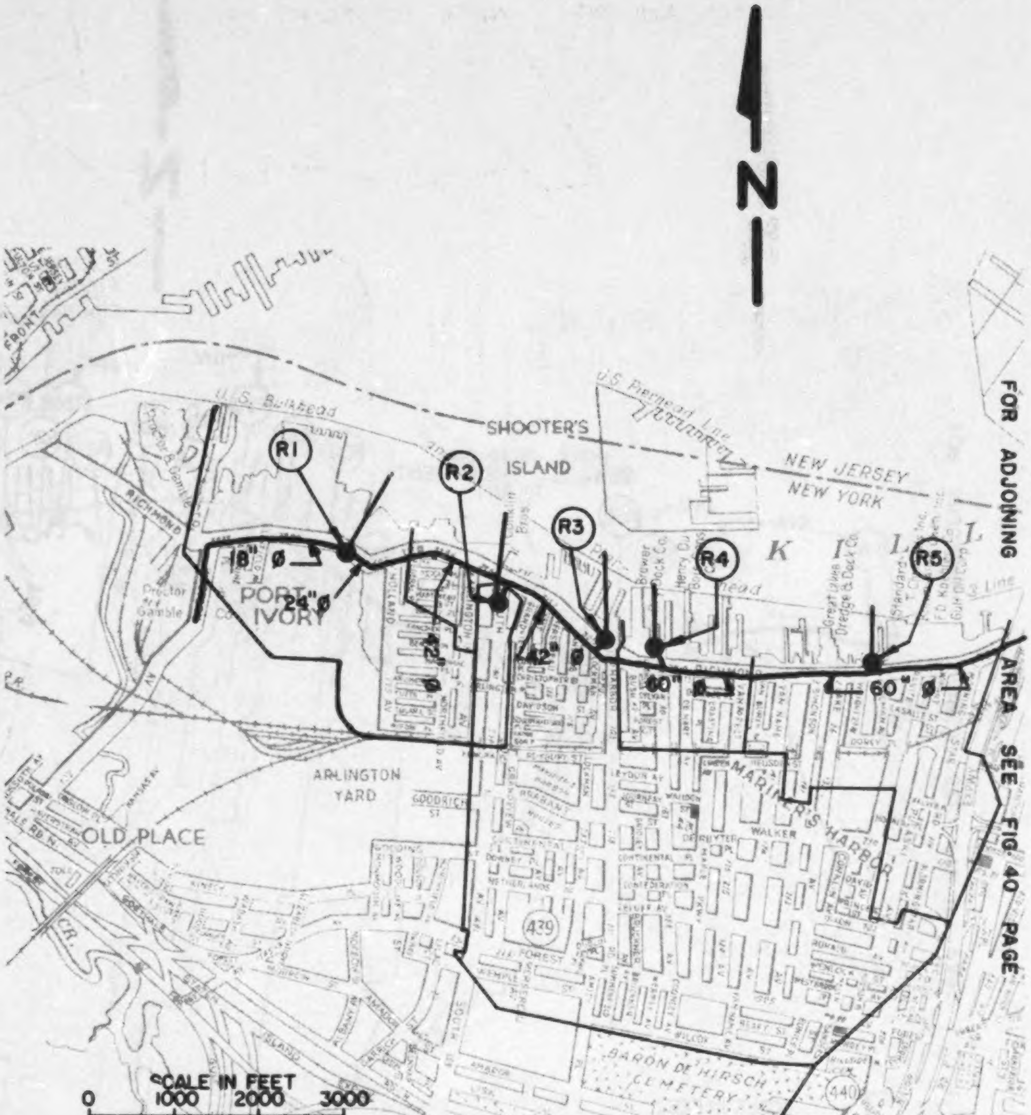

N
R1
R2
R3
R4
R5
18" Ø
24" Ø
42" Ø
60" Ø
60" Ø
U.S. Bulkhead
U.S. Pierhead Line
SHOOTER'S ISLAND
NEW JERSEY
NEW YORK
PORT IVORY
Proctor & Gamble
ARLINGTON YARD
OLD PLACE
MARINER'S HARBOR
BARON DE HIRSCH CEMETERY
439
440
SCALE IN FEET
0
1000
2000
3000

FIG. 41 PORT RICHMOND
STATEN ISLAND, N.Y.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

FOR ADJOINING AREA SEE FIG. 40 PAGE

FOR ADJOINING AREA SEE FIG. 42 PAGE

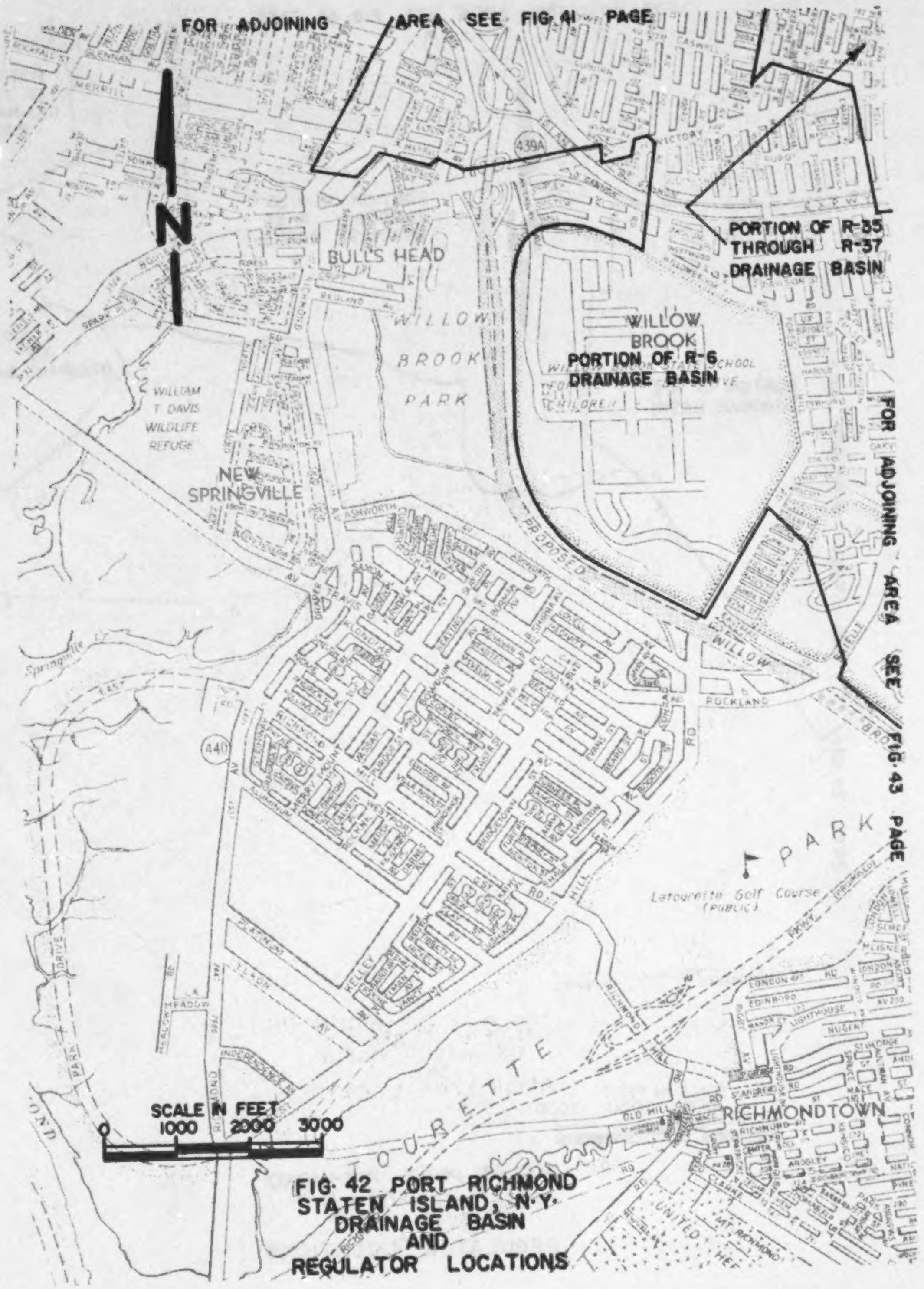

FOR ADJOINING AREA SEE FIG. 41 PAGE
N
BULL'S HEAD
WILLOW BROOK PARK
WILLOW BROOK
PORTION OF R-6 DRAINAGE BASIN
PORTION OF R-35 THROUGH R-37 DRAINAGE BASIN
FOR ADJOINING AREA SEE FIG. 43 PAGE
WILLIAM T DAVIS WILDLIFE REFUGE
NEW SPRINGVILLE
PROPOSED
WILLOW
ROCKLAND
439A
440
PARK
Latourette Golf Course (PUBLIC)
TOURETTE
RICHMONDTOWN
SCALE IN FEET
0
1000
2000
3000

FIG. 42 PORT RICHMOND
STATEN ISLAND, N.Y.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

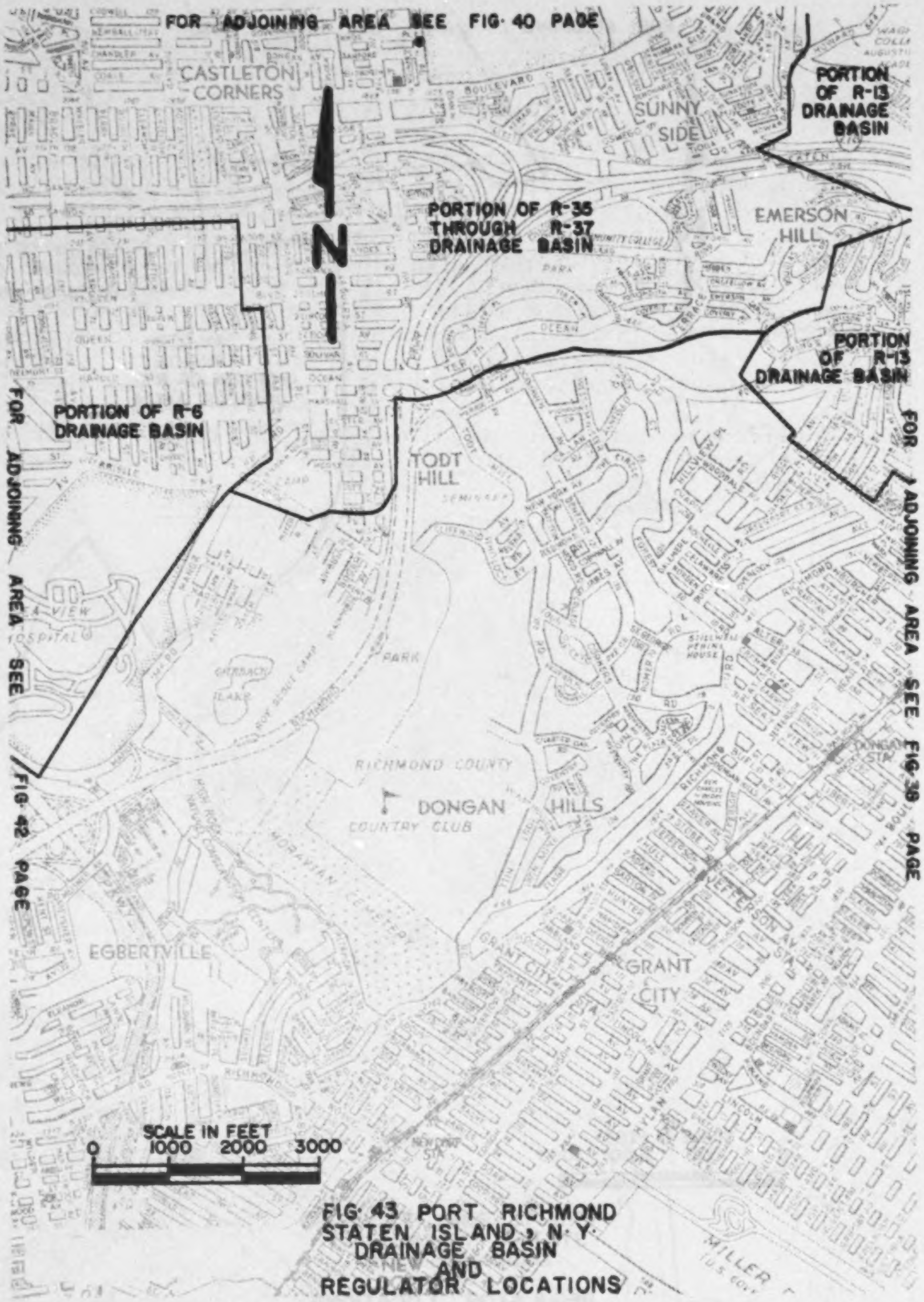

FOR ADJOINING AREA SEE FIG. 40 PAGE
CASTLETON CORNERS
SUNNY SIDE
PORTION OF R-13 DRAINAGE BASIN
N
PORTION OF R-35 THROUGH R-37 DRAINAGE BASIN
EMERSON HILL
PORTION OF R-13 DRAINAGE BASIN
PORTION OF R-6 DRAINAGE BASIN
FOR ADJOINING AREA SEE FIG 42 PAGE
FOR ADJOINING AREA SEE FIG 38 PAGE
TODT HILL
SEA VIEW HOSPITAL
PARK
RICHMOND COUNTY
DONGAN HILLS
COUNTRY CLUB
MORAVIAN CEMETERY
EGBERTVILLE
GRANT CITY
MILLER
SCALE IN FEET
0
1000
2000
3000

FIG. 43 PORT RICHMOND
STATEN ISLAND, N.Y.
DRAINAGE BASIN
AND
REGULATOR LOCATIONS

SECTION XIV

RED HOOK SEWAGE TREATMENT PLANT

DRAINAGE BASIN, BROOKLYN, N.Y.

The drainage area for the proposed Red Hook Treatment Plant will consist of a sewage system containing twenty-four regulator structures. Nine will consist of sluice gates with hydraulic float systems, nine will be manually actuated shear or sluice gates, two will have sluice gates with mechanical float systems, three will be simple tide or diversion chambers and one will be a manually operated shear gate with provisions for a future hydraulic system. These regulators are all to be constructed and as such no field inspections were conducted in this drainage area.

Additional information regarding the regulators within this drainage area is found in Table 9 and Figures 44 through 45.

TABLE 9 - RED HOOK TREATMENT PLANT DRAINAGE BASIN

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-1	Van Brunt Street South Of Reed Street	12" x 12" Sluice Gate With Hydraulic Float System	34	1,000	1,700	1,100	0	0	100	0	0.314	N/A
R-2	Wolcott & Ferris Streets	36" x 34" & 36" x 24" Sluice Gates With Independent Mechanical Float Systems	1,218	123,900	54,400	36,300	50	0	40	10	31.032	N/A
R-3	Sullivan Street West of Ferris Street	12" ∅ Manually Operated Shear Gate	6	100	300	200	50	0	40	10	0.029	N/A
R-4	Ferris & King Streets	12" ∅ Manually Operated Shear Gate With Provisions for Future Hydraulic System	10	200	400	300	50	0	40	10	0.060	N/A
R-5	Pioneer & Conover Streets	12" ∅ Manually Operated Shear Gate	10	200	300	200	5	0	95	0	0.070	N/A
R-6	Verona Street West of Imlay Street	12" ∅ Manually Operated Shear Gate	6	200	300	200	5	0	95	0	0.059	N/A
R-7	Commerce Street West of Imlay Street	12" ∅ Manually Operated Shear Gate	6	200	300	200	5	0	95	0	0.220	N/A

TABLE 9 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS Interceptor Line Upstream	 Downstream	 Trunk Line	 By-Pass Line	 Outfall	Receiving Waterway	INSPECTION DATA Date	 Operable (Yes or No)	 Comments	Figure No. for Location of Regulator
R-1	--	15" ø VP BR INT To 60" ø Hor. Ellip. PRCP	30" ø BRICK	30" ø BRICK	30" ø BRICK	Buttermilk Channel	--	--	To Be Constructed	44
R-2	--	60" ø Hor. Ellip. PRCP	72" ø BRICK & 30" ø PRCP	72" ø BRICK	72" ø BRICK	Buttermilk Channel	--	--	To Be Constructed	44
R-3	--	15" ø BR INT To 60" ø Hor. Ellip. PRCP	15" ø BRICK & 6" ø VP	15" ø BRICK	15" ø BRICK	Buttermilk Channel	--	--	To Be Constructed	44
R-4	--	15" ø BR INT To 60" ø Hor. Ellip. PRCP	36" ø BRICK	36" ø BRICK	36" ø BRICK	Buttermilk Channel	--	--	To Be Constructed	44
R-5	60" ø Hor. Ellip PRCP	15" ø BR INT To 60" ø Hor. Ellip. PRCP	15" ø & 24" ø & 12" ø	30" ø BRICK	30" ø BRICK	Buttermilk Channel	--	--	To Be Constructed	44
R-6	60" ø Hor. Ellip PRCP	15" ø BR INT To 60" ø Hor. Ellip PRCP	24" ø	24" ø	24" ø	Buttermilk Channel	--	--	To Be Constructed	44
R-7	60" ø Hor. Ellip PRCP	15" ø BR INT To 60" ø Hor. Ellip. PRCP	24" ø	24" ø	24" ø	Buttermilk Channel	--	--	To Be Constructed	44

TABLE 9 - RED HOOK TREATMENT PLANT DRAINAGE BASIN (Continued)

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-8	Bowne Street West of Imlay Street	12" ∅ Manually Operated Sluice Gate	11	300	400	300	5	0	95	0	0.097	N/A
R-9	Hamilton Avenue & Perry Place	14" x 14" Sluice Gate With Hydraulic Float System	51	3,600	600	400	30	0	70	0	0.928	N/A
R-9A	Sackett Street & Ferry Place	Diversion & Tide Gate Chambers	7	700	300	200	10	0	90	0	0.162	N/A
R-10	Degrain & Van Brunt Streets	12" ∅ Manually Operated Shear Gate	7	500	400	200	15	0	80	5	0.248	N/A
R-11	Kane & Van Brunt Streets	18" x 12" Sluice Gate With Mechanical Float System	50	2,000	700	500	0	0	100	0	0.580	N/A
R-12	Amity & Columbia Streets	42" x 24" Sluice Gate With Hydraulic System	259	35,000	11,700	7,800	50	10	40	0	8.027	N/A

TABLE 9 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line Upstream	Interceptor Line Downstream	Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
R-8	60" ∅ Hor. Ellip PRCP	15" ∅ BR INT To 60" ∅ Hor. Ellip. PRCP	24" ∅	24" ∅	24" ∅	Buttermilk Channel	--	--	To Be Constructed	44
R-9	60" ∅ Hor. Ellip. PRCP	21" ∅ BR INT To 66" ∅ PRCP	6'-0" x 7'-3" BRICK & 15" ∅ BR INT From R-9A	6'-0" x 8'-6" BRICK	6'-0" x 8'-6" BRICK	Buttermilk Channel	--	--	To Be Constructed	44
R-9A	--	15" ∅ BR INT To 66" ∅ PRCP	4'-0" ∅ CI	4'-0" ∅ CI	4'-0" ∅ CI	Buttermilk Channel	--	--	To Be Constructed	44
R-10	--	15" ∅ BR INT To 66" ∅ PRCP	TWO 12" ∅ & 15" ∅ VP	18" ∅	18" ∅	Buttermilk Channel	--	--	To Be Constructed	44
R-11	66" ∅ PRCP	24" ∅ BR INT To 66" ∅ PRCP	18" ∅ & 54" EGG- SHAPED BRICK	54" EGG- SHAPED BRICK	54" EGG- SHAPED BRICK	East River	--	--	To Be Constructed	44
R-12	102" ∅ Hor. Ellip.	108" ∅ PRCP	90" ∅ PTRC	8'-6" x 8'-6" PTRC	8'-6" x 8'-6" PTRC	East River	--	--	To Be Constructed	44

TABLE 9 - RED HOOK TREATMENT PLANT DRAINAGE BASIN (Continued)

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-13	Atlantic Avenue West of Columbia Street	12" x 12" Manually Operated Sluice Gate	10	400	1,000	700	60	10	20	10	0.136	N/A
R-14	Joralemon Street West of Furman Street	12" ø Manually Operated Shear Gate	2	0	300	200	0	0	100	0	0.012	N/A
R-15	Montague Street West of Furman Street	18" x 12" Sluice Gate With Hydraulic Float System	36	5,700	1,000	700	50	10	38	2	1.283	N/A
R-16	Furman & Orange Streets	12" x 12" Sluice Gate With Hydraulic Float System	12	100	1,200	800	60	10	15	15	0.074	N/A
R-17	Fulton & Furman Streets	18" x 30" Sluice Gate with Hydraulic Float System	131	10,400	19,100	12,700	60	10	15	15	2.967	N/A
R-18	Main & Plymouth Streets	18" x 12" Sluice Gate with Hydraulic Float System	13	100	3,900	2,600	10	0	80	10	0.141	N/A
R-18 A	Washington & Plymouth Streets	Diversion & Tide Gate Chambers	21	200	3,300	2,200	10	0	80	10	1.221	N/A

TABLE 9 - (Continued)

Regu- lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall					
	Upstream	Downstream					Date	Operable (Yes or No)	Comments	
R-13	108" ∅	12" ∅ VP BR INT To 108" ∅	24" ∅	24" ∅	24" ∅	East River	--	--	To Be Constructed	44
R-14	108" ∅	12" ∅ VP BR INT To 108" ∅ PRCP	18" ∅ VP	18" ∅ VP	18" ∅ VP	East River	--	--	To Be Constructed	44
R-15	108" ∅	24" ∅ PRCP BR INT To 108" ∅ PRCP	4'-0" x 4'-0" FTRC	4'-0" x 4'-0" FTRC	4'-0" x 4'-0" FTRC	East River	--	--	To Be Constructed	44
R-16	108" ∅	108" ∅	TWO 15" ∅ VP	18" ∅ VP	18" ∅ VP	East River	--	--	To Be Constructed	44
R-17	108" ∅ Tunnel	42" ∅ BR INT To 108" ∅ Tunnel	6'-0" x 6'-0" FTRC & 18" ∅ VP	6'-0" x 6'-0" FTRC	6'-0" x 6'-0" FTRC	East River	--	--	To Be Constructed	44
R-18	108" ∅ Tunnel	24" ∅ BR INT To 108" ∅ Tunnel	24" ∅ BRICK & 24" ∅ RC FROM R-18 A	36" ∅ RC	36" ∅ RC	East River	--	--	To Be Constructed	44
R-18 A	--	24" ∅ RC To REG. R-18	36" ∅ BRICK	36" ∅ BRICK	36" ∅ BRICK	East River	--	--	To Be Constructed	44

TABLE 9 - RED HOOK TREATMENT PLANT DRAINAGE BASIN (Continued)

BROOKLYN, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
R-19	John & Adams Streets	12" ∅ Manually Operated Shear Gate	3	0	600	400	0	0	100	0	0.025	N/A
R-19 A	John & Pearl Streets	Diversion & Tide Gate Chambers	47	600	5,700	3,800	15	0	85	0	0.551	N/A
R-20	Gold & Plymouth Streets	TWO 36" x 40" Sluice Gates with Hydraulic Float Systems	963	114,400	78,700	52,500	40	20	35	5	28.421	N/A
R-21	Hudson & Plymouth Streets	12" x 12" Sluice Gate with Hydraulic Float System	17	0	1,200	800	0	0	100	0	0.087	N/A

NOTES FOR TABLE 9:

Regulator Data - taken from regulator detail sheets (1970) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Drainage Area Data - boundaries determined from Existing Sewer Line Map of Brooklyn. Acreage taken from data (1962) supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control.

Population Data - from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (for the year 2000).

Land Use Data - estimated from Land Use Policy Maps in Plan for New York City, A Proposal-1969, Volume 3-Brooklyn prepared by the New York City Planning Commission.

Hydraulic Data - taken from data supplied by New York City Environmental Protection Administration, Division of Water Resources and Water Pollution Control (for the year 2000).

TABLE 9 - (Continued)

Regu- lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
	Upstream	Downstream								
R-19	108" ∅ Tunnel	108" ∅ BR INT To 108" ∅ Tunnel	15" ∅ BRICK & 18" ∅ VP FROM R-19A	15" ∅ BRICK	15" ∅ BRICK	East River	--	--	To Be Constructed	44
R-19 A	--	18" ∅ VP To REG R-19	36" ∅ BRICK	36" ∅ BRICK	36" ∅ BRICK	East River	--	--	To Be Constructed	44
R-20	108" ∅ Tunnel	6'-0" x 7'-0" FTRC BR INT To 108" ∅ Tunnel	13'-6" ∅ BRICK	13'-6" ∅ BRICK	13'-6" ∅ BRICK	East River	--	--	To Be Constructed	45
R-21	108" ∅ Tunnel	18" ∅ VP BR INT To 108" ∅ Tunnel	4'-6" x 7'-3" BRICK & 18" ∅ VP	4'-6" x 7'-3" BRICK	4'-6" x 7'-3" BRICK	East River	--	--	To Be Constructed	45

NOTES FOR TABLE 9 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Existing Sewer Line Maps of Brooklyn.

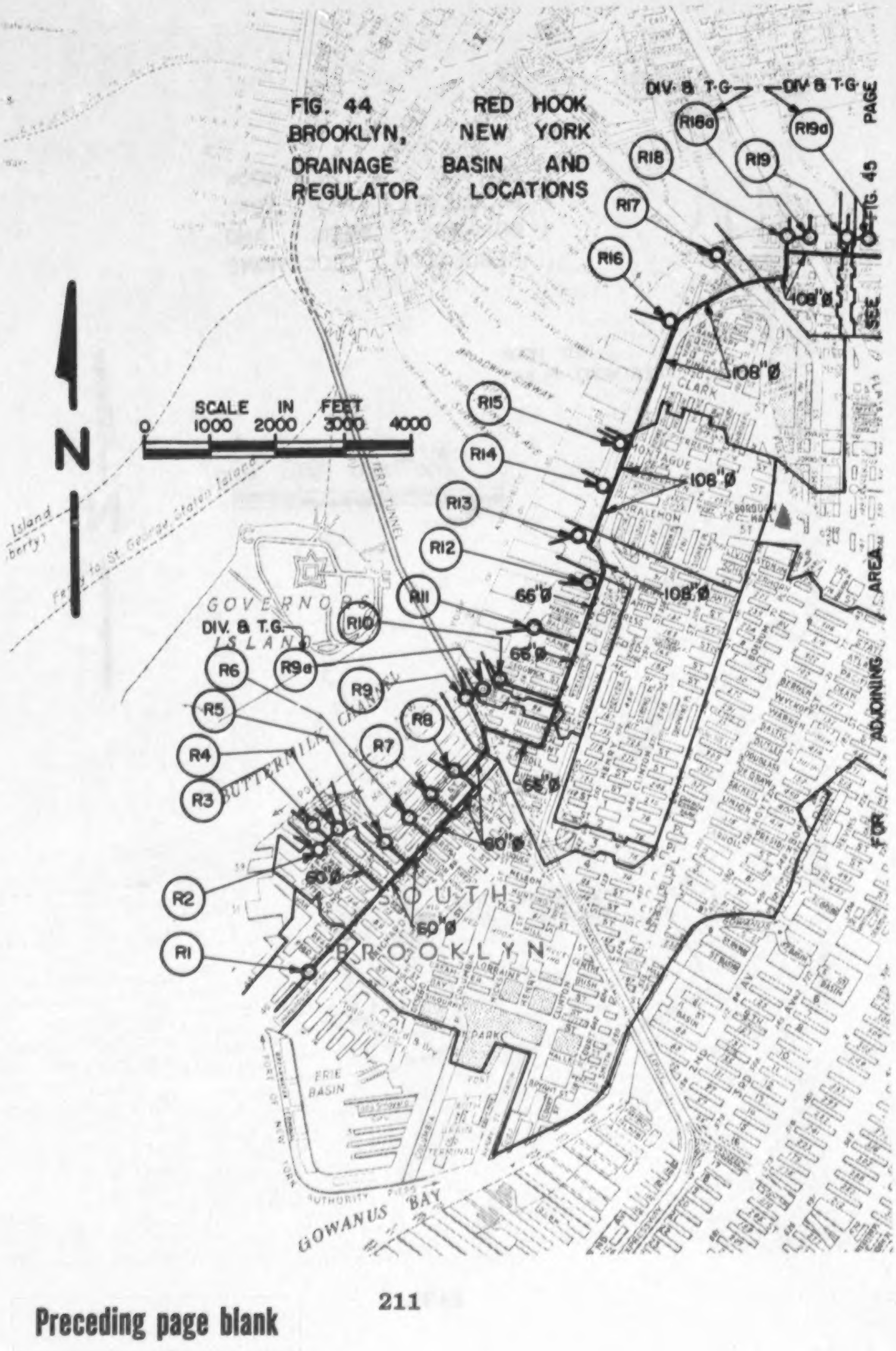


FIG. 44 RED HOOK
BROOKLYN, NEW YORK
DRAINAGE BASIN AND
REGULATOR LOCATIONS

DIV. & T.G.
DIV. & T.G.
R18a
R19a
R18
R19
R17
R16
SEE FIG. 45 PAGE
FOR ADJOINING AREA
108"Ø
108"Ø
108"Ø
108"Ø
CLARK
MONTAGUE
REMSEN
JORALEMON
BOROUGH HALL
R15
R14
R13
R12
R11
R10
66"Ø
66"Ø
66"Ø
DIV. & T.G.
R9a
R9
R8
R7
R6
R5
R4
R3
R2
R1
90"Ø
60"Ø
60"Ø
SCALE IN FEET
0
1000
2000
3000
4000
N
GOVERNORS ISLAND
BUTTERMILK CHANNEL
TUNNEL
SOUTH BROOKLYN
ERIE BASIN
GOWANUS BAY
Ferry to St. George, Staten Island

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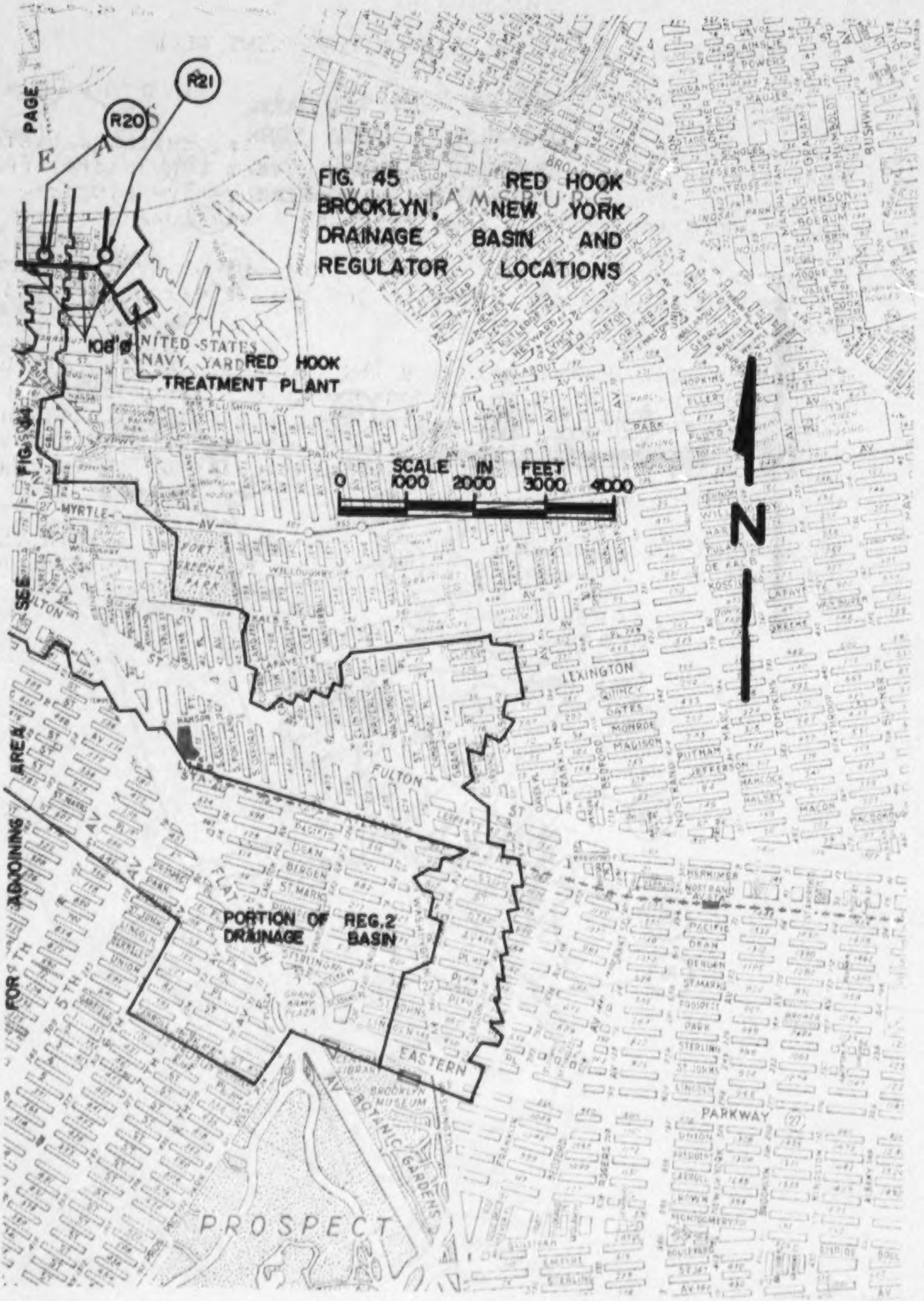

FIG. 45 RED HOOK BROOKLYN, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS

R21
R20
108"ø
UNITED STATES NAVY YARD
RED HOOK TREATMENT PLANT
WILLIAMSBURG
SCALE IN FEET
0
1000
2000
3000
4000
N
PORTION OF REG. 2 DRAINAGE BASIN
FOR ADJOINING AREA SEE FIG. 44 PAGE
MYRTLE AV
FORT GREENE PARK
FULTON
LEXINGTON
FLATBUSH
EASTERN PARKWAY
BROOKLYN MUSEUM
BOTANIC GARDENS
PROSPECT

SECTION XV

YONKERS JOINT MEETING SEWAGE TREATMENT PLANT

DRAINAGE BASIN, YONKERS, N.Y.

The sewage system for Yonkers Joint Meeting drainage basin consists of eighteen regulators. Fourteen regulators are mechanical float actuated, three regulators are electrically operated, and one regulator has a stationary weir.

A special crew from the Yonkers Department of Public Works is used to inspect and maintain the regulators on a routine basis.

During the field inspection by the Commission, five of the regulators were found to be non-operable. According to a follow-up telephone conversation with the Chief of Regulator Maintenance, Westchester County Department of Environmental Facilities, repair work is continuing on those regulators which are inoperable.

Additional information regarding the regulators within this drainage area is found in Table 10 and Figures 46 through 47.

TABLE 10 - YONKERS TREATMENT PLANT DRAINAGE BASIN

YONKERS, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
1	W. of Lamartine Ave. & N. of Babcock Place (In Railroad Yd.)	Stationary Gate with Mechanical Float Actuated 3.6" x 4.8" Moveable Flume	300 (Combined Data for Regulators 1, 2 & 6)	7,000	N/A	N/A	70	5	15	10	N/A	N/A
2	Lamartine Ave. West of Woodworth Ave.	Hinged Gate with Mechanical Float System										
3	Ashburton Ave. and Alexander St.	Stationary Gate with Mechanical Float Actuated 4.8" x 4.8" Moveable Flume	170 (Combined Data for Regulators 3, 4 & 5)	4,000	N/A	N/A	70	5	20	5	N/A	N/A
4	Ashburton Ave. East of Woodworth Ave.	Hinged Gate with Mechanical Float System										
5	Woodworth Ave. North of Ashburton Ave.	Hinged Gate with Mechanical Float System										
6	Ravine Ave. North of Lamartine Ave.	Hinged Gate with Mechanical Float System	(See Regulator 1 for Combined Data)									
7	Warburton Ave. W. of Fire House (Near Railroad Tracks)	18" x 24" Sluice Gate with Electrically Operated Hydraulic System.	730	4,000	N/A	N/A	80	0	10	10	N/A	N/A

TABLE 10 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line		Trunk Line	By-Pass Line	Outfall					
	Upstream	Downstream					Date	Operable (Yes or No)	Comments	
1	---	20" ∅ CI	48" ∅ CI	48" ∅ CI	48" ∅ CI	Hudson River	6/7/72	Yes	- - -	46
2	66" ∅ RC	16" ∅ CI BR To 72" ∅ RC	30" x 44" EGG SHAPED BRICK	30" x 44" EGG SHAPED BRICK	30" x 44" EGG SHAPED BRICK	Hudson River	6/7/72	No	Float Actuated Hinged Gate Missing.	46
3	20" ∅ CI	12" ∅ CI BR INT To 24" ∅ CI	12" ∅ CI and 48" ∅ BRICK	48" ∅ BRICK	48" ∅ BRICK	Hudson River	6/7/72	Yes	- - -	46
4	72" ∅ RC	12" ∅ CI BR INT To 72" ∅ RC	24" x 36" EGG SHAPED BRICK	24" x 36" EGG SHAPED BRICK	24" x 36" EGG SHAPED BRICK	Hudson River	6/7/72	Yes	- - -	46
5	72" ∅ RC	10" ∅ CI BR INT To 72" ∅ RC	18" ∅	18" ∅	48" ∅ BRICK	Hudson River	6/7/72	Yes	- - -	46
6	66" ∅ RC	10" ∅ CI BR INT To 66" ∅ RC	18" ∅ VP	18" ∅ VP	48" ∅	Hudson River	6/7/72	No	Needs Maintenance.	46
7	66" ∅ RC	66" ∅ RC	48" ∅ CI	48" ∅ CI	48" ∅ CI	Hudson River	6/7/72	- -	Not Able to Locate.	47

TABLE 10 - YONKERS TREATMENT PLANT DRAINAGE BASIN (Continued)

YONKERS, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
8	W. of 719 - Warburton Ave. (Near Railroad Tracks)	18" x 18" Sluice Gate with Electrically Operated Hydraulic System.	15	320	N/A	N/A	90	0	10	0	N/A	N/A
9	Roberts Lane East of Railroad Tracks	Sluice Gate with Electrically Operated Hydraulic System	330	3,700	N/A	N/A	80	5	10	5	N/A	N/A
10	Warburton Ave. South of Odell Ave.	Stationary Weir	200	1,500	N/A	N/A	40	5	15	40	N/A	N/A
11	Pier St. Between Bridge & Fernbrook Sts.	Sluice Gate with Mechanical Float System	490 (Combined Data for Regulators 11, 12 & 16)	15,400	N/A	N/A	60	15	10	15	N/A	N/A
12	Pier Street West of Hawthorne Ave.	16" x 34-1/2" Hinged Gate with Mechanical Float System										
13	Ashton Road East of Sunnyside Dr.	16" x 27-1/2" Shear Gate with Mechanical Float System	180	6,100	N/A	N/A	60	15	10	15	N/A	N/A
14	Herriot St. & Buena Vista	18" ø Hinged Gate with Mechanical Float System	130	4,200	N/A	N/A	65	10	15	10	N/A	N/A

TABLE 10 - (Continued)

Regulator Number	LINE SIZE CHARACTERISTICS					Receiving Waterway	INSPECTION DATA			Figure No. for Location of Regulator
	Interceptor Line Upstream	Interceptor Line Downstream	Trunk Line	By-Pass Line	Outfall		Date	Operable (Yes or No)	Comments	
8	66" ø RC	18" ø CI BR INT To 66" ø RC	30" ø CI	30" ø CI	30" ø CI	Hudson River	6/8/72	- -	Not Able to Locate.	47
9	66" ø RC	24" ø CI BR INT To 66" ø RC	30" ø CI	30" ø CI	30" ø CI	Hudson River	6/7/72	No	Equipment Corroded. Gate Frozen in Open Position. Difficult Access.	47
10	60" ø RC	12" ø CI BR INT To 60" ø RC	4'-0" x 4'-0" RC	4'-0"x 4'-0" RC	4'-0" x 4'-0" RC	Hudson River	6/7/72	Yes	- - -	47
11	---	14" ø CI BR INT To LUDLOW PUMP HOUSE	3'-1" x 3'-6" EGG SHAPED BRICK & 54" ø BRICK	7'-0" x 4'-6" SEMI-CIRCULAR BRICK	7'-0" x 4'-6" SEMI-CIRCULAR BRICK	Hudson River	6/8/72	Yes	- - -	46
12	---	42" ø CI BR INT	54" ø BRICK	54" ø BRICK	54" ø BRICK	Hudson River	6/8/72	No	Hinged Gate Frozen in Open Position. No Connection Between Gate and Float.	46
13	---	30" ø CI BR INT To 60" ø RC	48" ø BRICK	48" ø BRICK	48" ø BRICK	Hudson River	6/8/72	Yes	Difficult to Maintain Equipment Properly Because of Restricted Working Space.	46
14	---	20" ø CI BR INT	3'-6" x 2'-7" EGG SHAPED BRICK	3'-6" x 2'-7" EGG SHAPED BRICK	3'-6" x 2'-7" EGG SHAPED BRICK	Hudson River	6/7/72	No	Equipment Corroded.	46

TABLE 10 - YONKERS TREATMENT PLANT DRAINAGE BASIN (Continued)

YONKERS, NEW YORK

Regulator Number	Location	Type	Drainage Area (Acres)	Population			Percent Land Use				Trunk Line MDWF (cfs)	Interceptor Design Capacity (cfs)
				Residential	Working	Transient	Res.	Com.	Ind.	Oth.		
15	Main St. at Railroad Tracks (Inside Pump Station)	Hinged Gate with Mechanical Float System	825	37,900	N/A	N/A	70	10	5	15	N/A	N/A
16	Hawthorne Ave. North of Pier Street	Stationary Gate with Mechanical Float Actuated Moveable Flume	(See Regulator 11 for Combined Data)									
17	New Main St. At Getty Square	36" ∅ Hinged Gate with Mechanical Float System	(See Regulator 15 for Combined Data)									
18	Wells Ave. At Alexander Street	Hinged Gate with Mechanical Float System	80	1,000	N/A	N/A	65	10	10	15	N/A	N/A

NOTES FOR TABLE 10:

Regulator Data - taken from regulator detail sheets (1934) supplied by Westchester County Department of Environmental Facilities.

Drainage Area Data - boundaries taken from Existing Sewer Line Map of Yonkers (1934) supplied by the City of Yonkers Engineering Office. Acreage calculated from Yonkers Census Tract Map supplied by the (Yonkers) City Planning Board.

Population Data - taken from Census Tract Map (for the year 1970) supplied by the (Yonkers) City Planning Board.

Land Use Data - estimated from map in Community Facility Plan adopted June, 1961 by the (Yonkers) City Planning Board.

Hydraulic Data - not available.

TABLE 10 - (Continued)

Regu-lator Number	LINE SIZE CHARACTERISTICS: Interceptor Line: Upstream	Interceptor Line: Downstream	Trunk Line	By-Pass Line	Outfall	Receiving Waterway	INSPECTION DATA: Date	Operable (Yes or No)	Comments	Figure No. for Location of Regulator
15	---	14" ø CI BR INT To MAIN ST. PUMP STATION	6'-9" x 6'-9" FLAT TOP BRICK & CONC.	6'-9" x 6'-9" FLAT TOP BRICK & CONC.	6'-9" x 6'-9" FLAT TOP BRICK & CONC.	Hudson River	6/7/72	Yes	- - -	46
16	---	20" ø CI BR INT	28" x 42" EGG SHAPED BRICK	28" x 42" EGG SHAPED BRICK	28" x 42" EGG SHAPED BRICK	Hudson River	6/7/72	Yes	- - -	46
17	78" ø	36" ø CI BR INT To 78" ø	48" ø BRICK	48" ø BRICK	48" ø BRICK	Hudson River	6/8/72	Yes	- - -	46
18	---	14" ø CI BR INT	48" ø BRICK	48" ø BRICK	48" ø BRICK	Hudson River	6/7/72	Yes	- - -	46

NOTES FOR TABLE 10 (CONTINUED):

Line Size Characteristics - taken from regulator detail sheets and Existing Sewer Line Map of Yonkers.

Inspection Data - According to phone conversation of June 30, 1972 with Chief of Regulator Maintenance, Weschester County Department of Environmental Facilities, repair work is continuing on those regulators which are inoperable. Also, the two regulators which were not located during the field inspection, were said to be in similar condition as regulator 9.

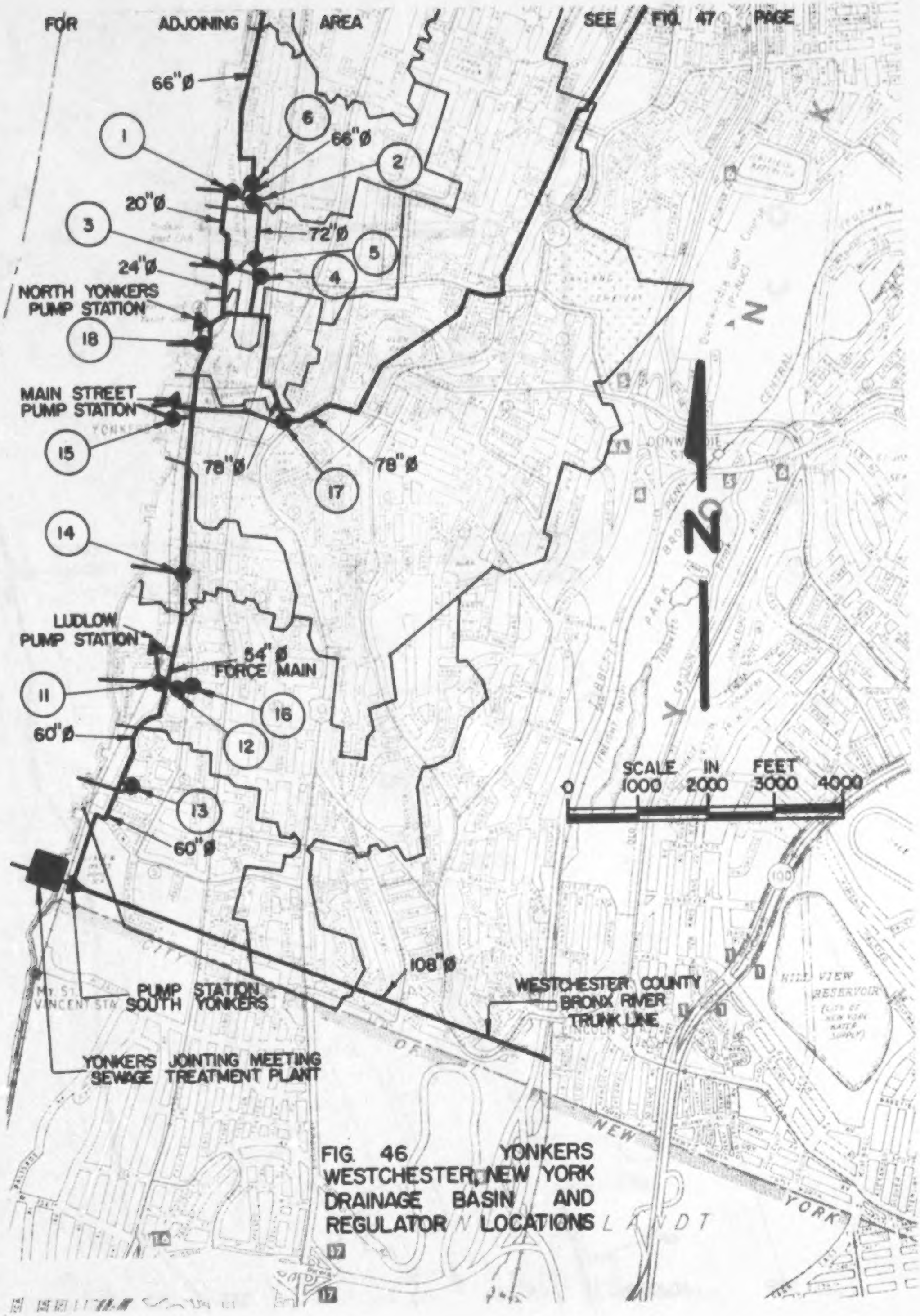
FOR ADJOINING AREA SEE FIG. 47 PAGE
66"Ø
1
6
66"Ø
2
20"Ø
72"Ø
3
5
24"Ø
4
NORTH YONKERS PUMP STATION
18
MAIN STREET PUMP STATION
15
78"Ø
17
78"Ø
14
N
LUDLOW PUMP STATION
54"Ø FORCE MAIN
11
16
12
60"Ø
SCALE IN FEET
0
1000
2000
3000
4000
13
60"Ø
108"Ø
PUMP STATION SOUTH YONKERS
WESTCHESTER COUNTY BRONX RIVER TRUNK LINE
YONKERS JOINTING MEETING SEWAGE TREATMENT PLANT
HILL VIEW RESERVOIR

FIG. 46 YONKERS WESTCHESTER, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS

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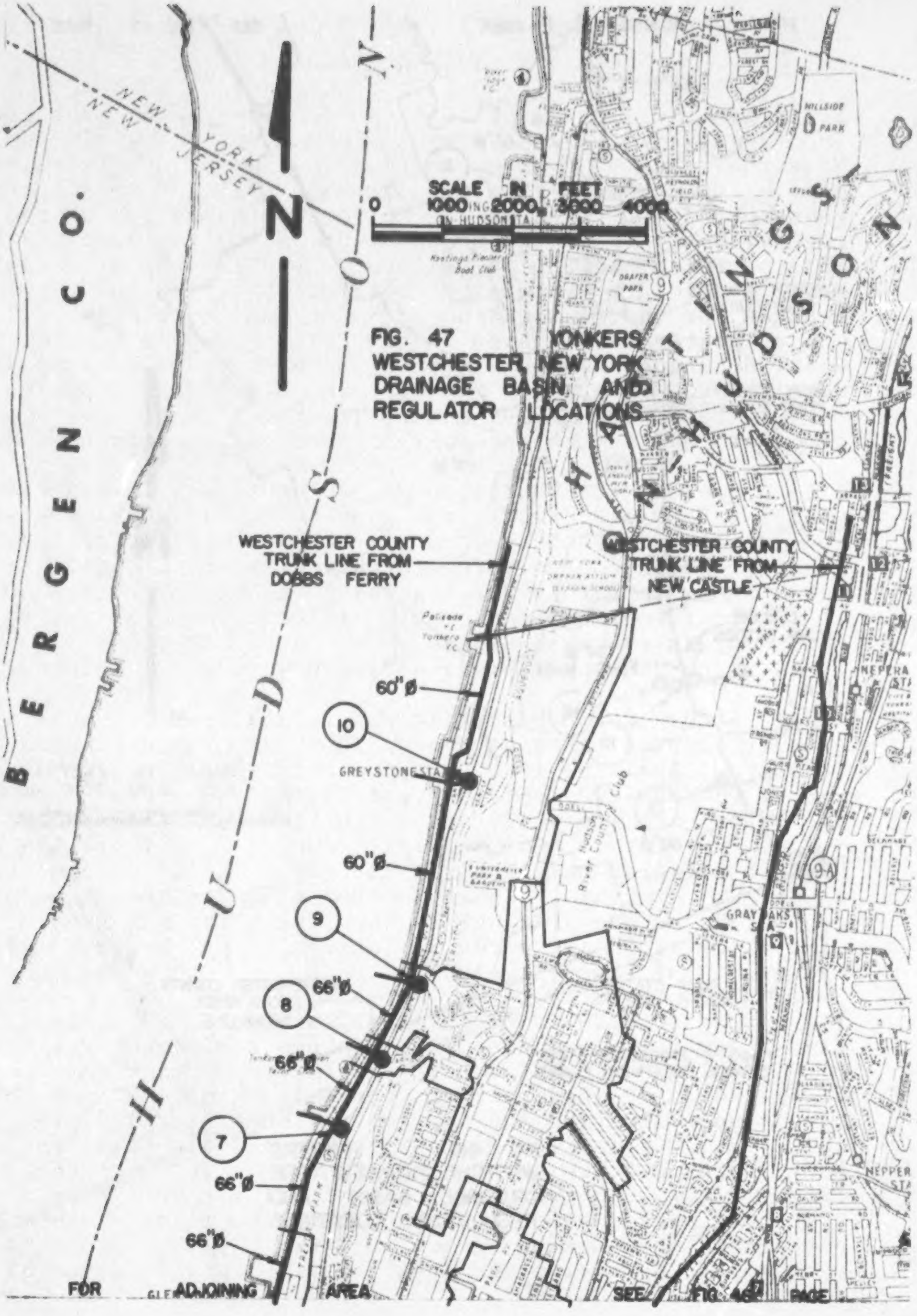

FIG. 47 YONKERS WESTCHESTER, NEW YORK DRAINAGE BASIN AND REGULATOR LOCATIONS

SCALE IN FEET
0 1000 2000 3000 4000
N
NEW YORK
NEW JERSEY
BERGEN CO.
HUDSON
HASTINGS ON HUDSON
Hastings Pleasure Boat Club
DRAPER PARK
HILLSIDE PARK
WESTCHESTER COUNTY TRUNK LINE FROM DOBBS FERRY
WESTCHESTER COUNTY TRUNK LINE FROM NEW CASTLE
Palisade Yonkers Y.C.
60"Ø
10
GREYSTONE STA.
60"Ø
9
66"Ø
8
66"Ø
7
66"Ø
66"Ø
River Hudson County Club
GRAY OAKS STA.
NEPERA STA.
FOR ADJOINING AREA SEE FIG 46 PAGE

SECTION XVI

REGULATOR SAMPLINGS AND ANALYSES

It is generally realized that the combined sewer overflows from regulators have an adverse impact upon receiving waters. Nevertheless, there appeared to be a lack of quantitative data within the Interstate Sanitation District to support this contention. Therefore, following inspection of the regulators, the Commission undertook a limited sampling and analysis study of two regulators. (Analyses of all samples were performed by laboratory methods specified in "Standard Methods for the Examination of Water and Wastewater", (2).) One regulator was located in the Bayonne Sewage Treatment Plant drainage and had a mean dry weather flow of approximately 5 MGD (Regulator No. 5). The other regulator (No. B-1) served the Newtown Creek Sewage Treatment Plant drainage basin and had a mean dry weather flow of approximately 50 MGD.

A land use map for Regulator No. 5 located at Ingham Avenue south of East 5th Street in Bayonne is shown on Figure 48, and the land use and demographic characteristics of the drainage basin for this regulator are shown in Table 11. The table shows that this drainage basin is approximately 50% residential and 30% industrial. A location plan of the regulator is shown in Figure 49. Figures 50-A and 50-B are photographs showing flows associated with the regulator.

A 24-hour dry weather sampling of regulator flow consisting of grab samples taken at 3-hour intervals was conducted on Wednesday, April 5, 1972. During this sampling period, no bypass was observed and no precipitation occurred. The regulator gate was fully open with flow variations noted on the field records. On Wednesday, April 12, 1972, a 12-hour dry weather grab sampling was undertaken at this regulator at 3-hour intervals. Again no bypassing was observed and no precipitation occurred during sampling. The analyses of the samples obtained are given in Tables 12 and 13 for April 5 and April 12, respectively.

The data developed is of interest in several respects. The time sequence of samples clearly shows a distinct variation of many of the parameter readings in the daytime compared to nighttime. For instance, the composite sample of the total suspended solids for the daytime period on April 5, 1972, (0900 to 2100) was 156 Mg/L while for the nighttime and early morning hours (2100 to 0900) it was 55 Mg/L (see Table 12). The daytime values on April 12, 1972, for suspended solids given in Table 13 for daylight hours are comparable to those presented in Table 12, although each of the samplings shows a large variability as a function of time.

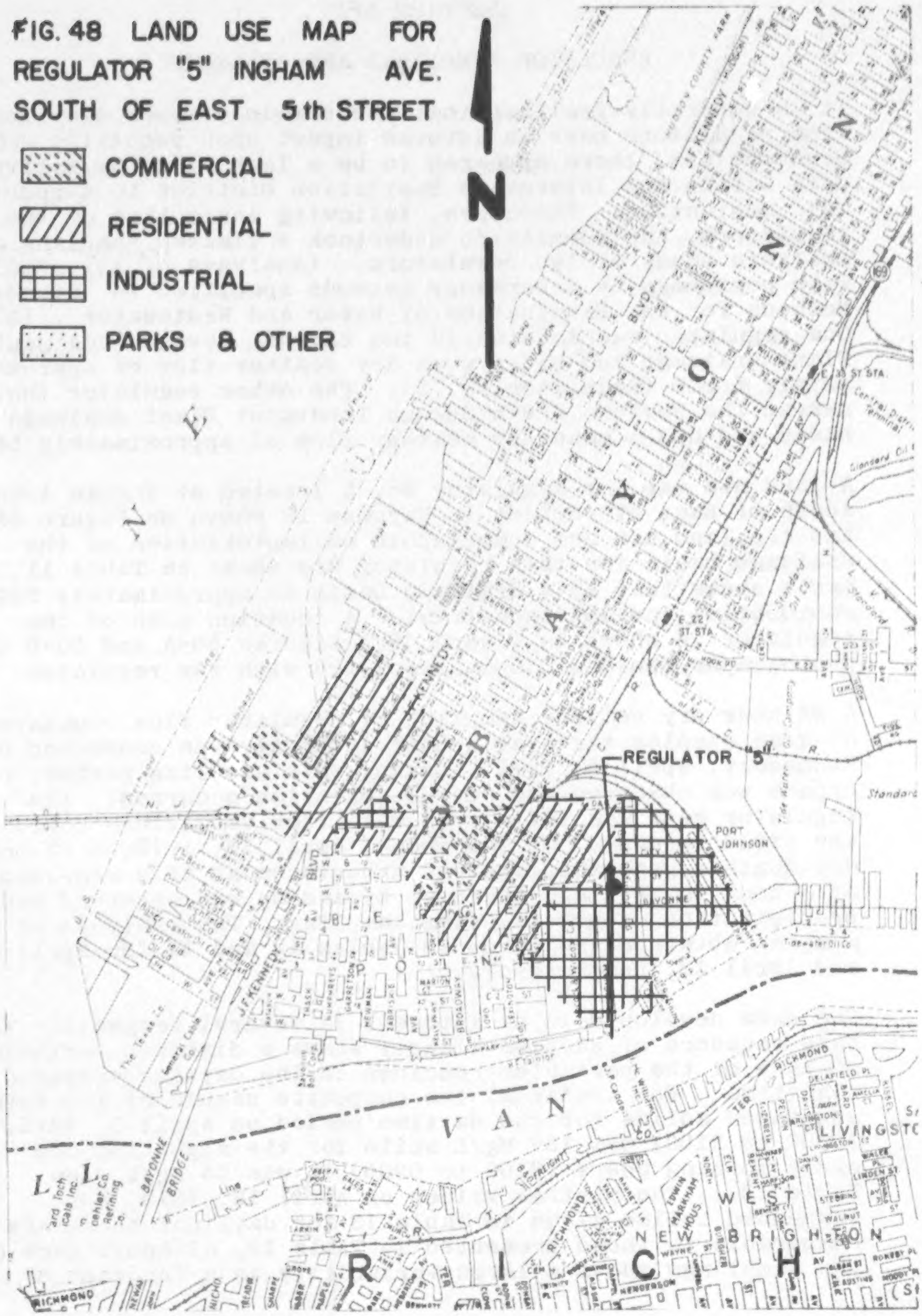

FIG. 48 LAND USE MAP FOR REGULATOR "5" INGHAM AVE. SOUTH OF EAST 5th STREET

▨ COMMERCIAL
▨ RESIDENTIAL
▦ INDUSTRIAL
⬚ PARKS & OTHER
N
REGULATOR "5"
PORT JOHNSON
BAYONNE BRIDGE
J.F. KENNEDY BLVD
NEW BRIGHTON
LIVINGSTON
WEST
RICHMOND
K I L L V A N
R I C H
B A Y O N N E
Standard Oil Co.
Tidewater Oil Co.
E. 33 ST STA.
E. 22 ST STA.
169

TABLE 11

LAND USE AND DEMOGRAPHIC CHARACTERISTICS OF DRAINAGE BASIN

(Regulator 5 - Bayonne)

Population	10,760	(residential)
Area (Acres)	219.0	
Population Density	491	people/acre
Land Use		
% residential	50	
% commercial	15	
% industrial	30	
% other	5	
Streets		
Total Length (Miles)	9.36	
Estimated number of catch basins	175	

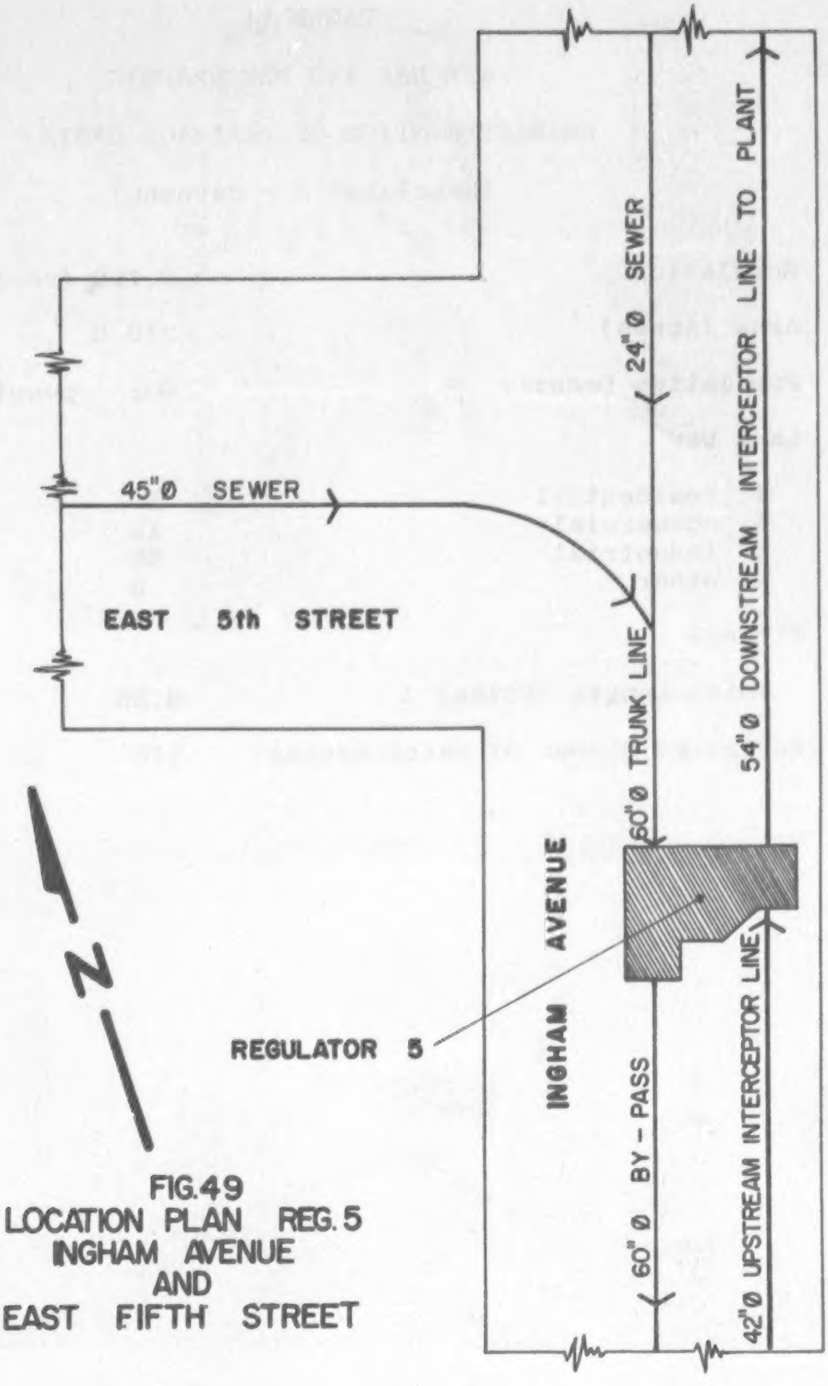
45"Ø SEWER
EAST 5th STREET
24"Ø SEWER
60"Ø TRUNK LINE
54"Ø DOWNSTREAM INTERCEPTOR LINE TO PLANT
INGHAM AVENUE
REGULATOR 5
60"Ø BY-PASS
42"Ø UPSTREAM INTERCEPTOR LINE
N

FIG.49
LOCATION PLAN REG. 5
INGHAM AVENUE
AND
EAST FIFTH STREET

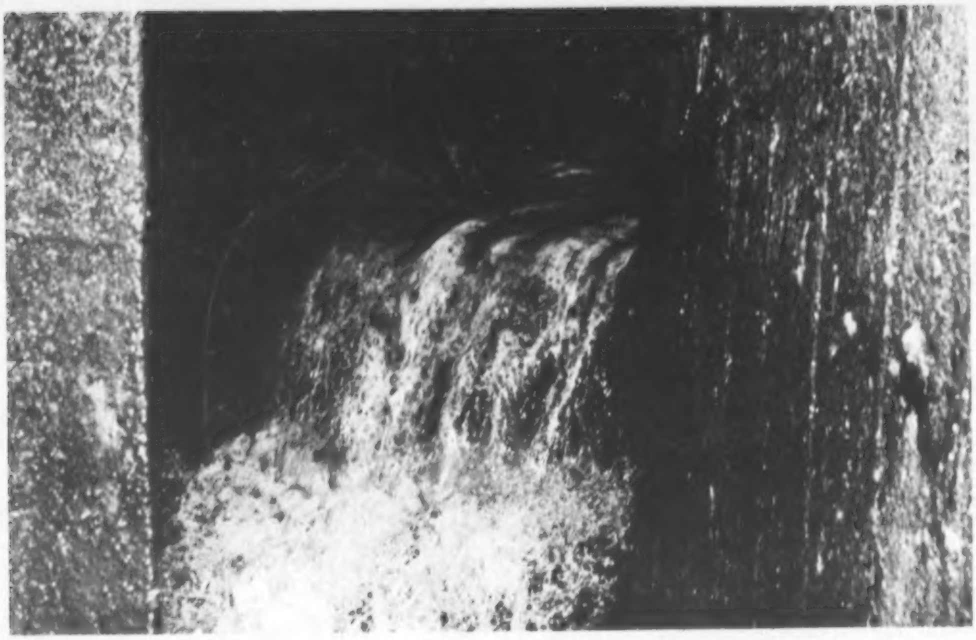

FIG. 50-A, TRUNK LINE FLOW TO REGULATOR CHAMBER AT REGULATOR 5, INGHAM AVENUE AND EAST 5TH STREET, BAYONNE, NEW JERSEY

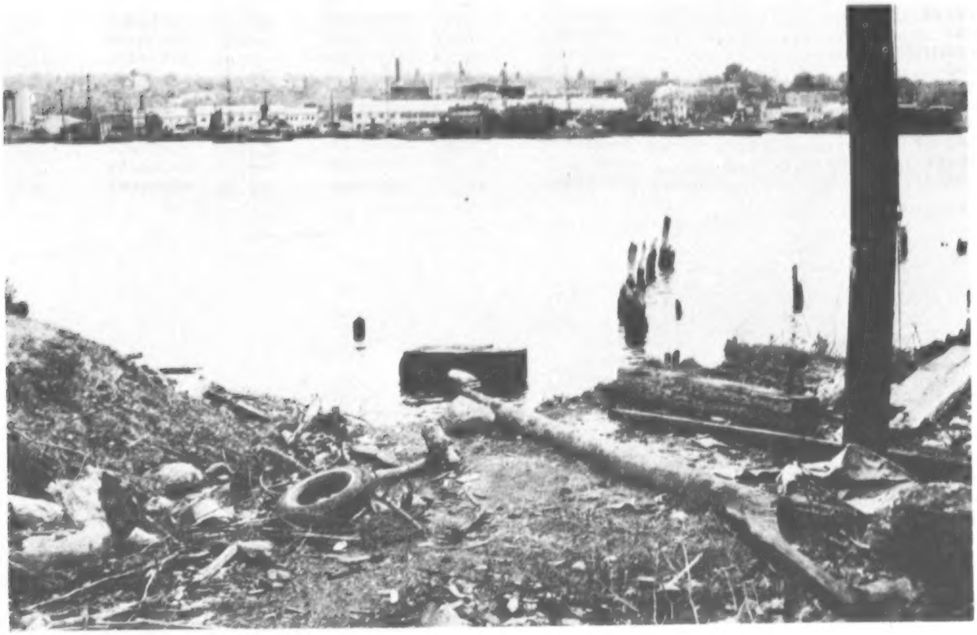

FIG. 50-B, OUTFALL FOR REGULATOR 5, INGHAM AVENUE AND EAST 5TH STREET, BAYONNE, NEW JERSEY

TABLE 12 - REGULATOR 5, EAST 5th STREET AND INGHAM AVENUE

DRY WEATHER SAMPLING RESULTS FOR APRIL 4, 5, 1972

SUMMARY OF THE ANALYSES OF SAMPLES TAKEN WITHIN
BAYONNE DRAINAGE AREA   REGULATOR: 5
EAST 5TH STREET AND INGHAM AVENUE
BAYONNE   NEW JERSEY 07002

DISCHARGE WATERWAY: KILL VAN KULL   I.S.C. WATER CLASSIFICATION: B2

DATE OF SAMPLING: 4/5/72 & 4/6/72   NUMBER OF SAMPLES TAKEN: 11

SAMPLED BY: INTERSTATE SANITATION COMMISSION
ANALYSES PERFORMED BY: INTERSTATE SANITATION COMMISSION
I.S.C. INVESTIGATION NUMBER: 8938

PARAMETER	SAMPLE 1 POINT 1 4/5-0900	SAMPLE 2 POINT 1 4/5-1200	SAMPLE 3 POINT 1 4/5-1500	SAMPLE 4 POINT 1 4/5-1800	SAMPLE 5 POINT 1 4/5-2100	SAMPLE 6 POINT 1 4/5-0900 TO 2100
TOTAL SUSPENDED SOLIDS	138	204	242	100	104	156
SETTLEABLE SOLIDS	36	54	5	24	8	47
COLIFORM DENSITY	********	>100000	********	>100000	********	********
BIOCHEMICAL OXYGEN DEMAND	150	185	145	258	212	196
TEMPERATURE	16.0	14.0	14.0	14.0	15.0	********
PH	7.8	8.2	7.7	7.6	7.2	********
CHLORIDES	162	118	224	146	143	165
TOTAL CARBON	20	26	30	13	20	22
TOTAL ORGANIC CARBON	13	21	30	13	15	17
OIL AND GREASE	********	36.6	********	32.8	********	********
TURBIDITY(UNSETTLED SAMPLE)	98	460	590	93	85	********
TURBIDITY(SETTLED SAMPLE)	********	********	********	********	********	********
ORTHO PHOSPHATE - P	7.20	8.44	5.86	3.45	4.36	5.86
AMMONIA - N	16.40	13.30	11.30	12.30	10.60	12.30
NITRITE - N	0.58	0.40	0.52	0.12	0.18	0.30
NITRATE - N	0.56	0.54	0.88	0.22	0.45	0.56
COPPER	********	0.10	********	0.10	********	0.10
ZINC	********	0.18	********	0.12	********	0.18
CHROMIUM	********	<0.05	********	<0.05	********	<0.05
LEAD	********	0.40	********	0.20	********	0.40
NICKEL	********	<0.10	********	<0.10	********	<0.10
CADMIUM	********	<0.02	********	<0.02	********	<0.02
MANGANESE	********	0.44	********	0.48	********	0.48
MERCURY	********	0.0350	********	0.0030	********	0.0270
SILVER	********	<0.05	********	<0.05	********	<0.05
COBALT	********	<0.05	********	<0.05	********	<0.05

TABLE 12 - (CONTINUED)

PARAMETER	SAMPLE 7 POINT 1 4/5-2400	SAMPLE 8 POINT 1 4/6-0300	SAMPLE 9 POINT 1 4/6-0600	SAMPLE 10 POINT 1 4/6-0900	SAMPLE 11 POINT 1 4/5-2100 TO 4/6-0900
TOTAL SUSPENDED SOLIDS	98	64	46	99	55
SETTLEABLE SOLIDS	38	********	2	39	20
COLIFORM DENSITY	********	********	>100000	********	********
BIOCHEMICAL OXYGEN DEMAND	78	35	42	168	185
TEMPERATURE	10.7	10.0	11.0	12.1	********
PH	6.4	7.1	7.3	7.6	********
CHLORIDES	2031	6409	882	314	1498
TOTAL CARBON	9	8	8	16	12
TOTAL ORGANIC CARBON	8	8	4	16	8
OIL AND GREASE	9.4	********	5.6	********	********
TURBIDITY(UNSETTLED SAMPLE) ...	35	16	23	********	********
TURBIDITY(SETTLED SAMPLE)	********	********	********	********	********
ORTHO PHOSPHATE - P	1.98	0.61	1.17	5.31	2.21
AMMONIA - N	7.30	4.00	5.80	18.90	8.70
NITRITE - N	0.17	0.21	0.21	0.24	0.23
NITRATE - N	0.39	0.47	0.67	0.56	0.45
COPPER	0.05	********	0.02	********	0.05
ZINC	0.06	********	0.06	********	0.12
CHROMIUM	<0.05	********	<0.05	********	<0.05
LEAD	0.20	********	<0.20	********	0.20
NICKEL	<0.10	********	<0.10	********	<0.10
CADMIUM	<0.02	********	<0.02	********	<0.02
MANGANESE	1.12	********	0.78	********	0.70
MERCURY	0.0018	********	0.0020	********	0.0016
SILVER	<0.05	********	<0.05	********	<0.05
COBALT	<0.05	********	<0.05	********	<0.05

NOTES:

(1) POINT 1 SAMPLES TAKEN FROM REGULATOR CHAMBER
POINT 2 SAMPLES TAKEN FROM TIDE GATE CHAMBER

(2) ALL UNITS ARE MILLIGRAMS PER LITER EXCEPT PH AND THE FOLLOWING:
TEMPERATURE - DEGREES CENTIGRADE
COLIFORM DENSITY - FECAL COLIFORM ORGANISMS PER 100 MILLILITERS
TURBITY - JACKSON TURBIDITY UNITS

(3)

SAMPLE	TYPE OF SAMPLE	FLOW TO INTERCEPTOR LINE (APPROX)
1	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
2	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
3	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
4	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
5	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
6	DRY WEATHER-COMPOSITE	FLOW NOT ESTIMATED
7	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
8	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
9	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
10	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
11	DRY WEATHER-COMPOSITE	FLOW NOT ESTIMATED

TABLE 13 - REGULATOR 5, EAST 5TH STREET AND INGHAM AVENUE

DRY WEATHER SAMPLING RESULTS FOR APRIL 12, 1972

SUMMARY OF THE ANALYSES OF SAMPLES TAKEN WITHIN
BAYONNE DRAINAGE AREA   REGULATOR: 5
EAST 5TH STREET AND INGHAM AVENUE
BAYONNE   NEW JERSEY 07002

DISCHARGE WATERWAY: KILL VAN KULL   I.S.C. WATER CLASSIFICATION: B2

DATE OF SAMPLING: 4/12/72   NUMBER OF SAMPLES TAKEN: 6

SAMPLED BY: INTERSTATE SANITATION COMMISSION
ANALYSES PERFORMED BY: INTERSTATE SANITATION COMMISSION
I.S.C. INVESTIGATION NUMBER: 8951

PARAMETER	SAMPLE 1 POINT 1 0900	SAMPLE 2 POINT 1 1200	SAMPLE 3 POINT 1 1500	SAMPLE 4 POINT 1 1800	SAMPLE 5 POINT 1 2100	SAMPLE 6 POINT 1 0900-2100
TOTAL SUSPENDED SOLIDS	210	324	188	70	36	171
SETTLEABLE SOLIDS	72	76	32	40	6	84
COLIFORM DENSITY	*********	>100000	*********	8900	*********	*********
BIOCHEMICAL OXYGEN DEMAND	180	277	194	26	100	150
TEMPERATURE	12.0	13.0	13.0	6.0	10.0	*********
PH	7.7	7.8	7.7	7.6	6.9	*********
CHLORIDES	2862	1968	525	10192	7644	4998
TOTAL CARBON	15	22	18	6	11	14
TOTAL ORGANIC CARBON	11	21	15	4	8	10
OIL AND GREASE	*********	6.5	*********	0.4	*********	*********
TURBIDITY(UNSETTLED SAMPLE) ..	*********	*********	*********	*********	65	220
TURBIDITY(SETTLED SAMPLE)	70	400	250	25	60	190
ORTHO PHOSPHATE - P	6.32	7.66	6.16	0.06	1.30	3.70
AMMONIA - N	29.00	11.10	15.50	0.80	2.10	12.10
NITRITE - N	0.23	0.20	0.19	0.09	0.15	0.16
NITRATE - N	0.43	0.41	0.48	0.20	0.37	0.33
COPPER	*********	0.02	*********	0.05	*********	0.05
ZINC	*********	0.16	*********	0.06	*********	0.12
CHROMIUM	*********	<0.05	*********	<0.05	*********	0.70
LEAD	*********	0.40	*********	0.40	*********	0.02
NICKEL	*********	<0.10	*********	<0.10	*********	<0.10
CADMIUM	*********	<0.02	*********	<0.02	*********	<0.02
MANGANESE	*********	0.44	*********	0.10	*********	0.28
MERCURY	*********	0.1720	*********	0.0009	*********	0.0484
SILVER	*********	<0.05	*********	<0.05	*********	<0.05
COBALT	*********	<0.05	*********	<0.05	*********	<0.05

NOTES:

(1) POINT 1 SAMPLES TAKEN FROM REGULATOR CHAMBER
POINT 2 SAMPLES TAKEN FROM TIDE GATE CHAMBER

(2) ALL UNITS ARE MILLIGRAMS PER LITER EXCEPT PH AND THE FOLLOWING:
TEMPERATURE - DEGREES CENTIGRADE
COLIFORM DENSITY - FECAL COLIFORM ORGANISMS PER 100 MILLILITERS
TURBIDITY - JACKSON TURBIDITY UNITS

(3)

SAMPLE	TYPE OF SAMPLE	FLOW TO INTERCEPTOR LINE (APPPOX)
1	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
2	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
3	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
4	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
5	DRY WEATHER-GRAB	FLOW NOT ESTIMATED
6	DRY WEATHER-COMPOSITE	FLOW NOT ESTIMATED

The values of the mercury concentrations also show a time dependent variation and in both sampling periods, the highest values occurred at the 12 noon sample which may indicate that the discharge of the mercury into the sewer lines was probably associated with industrial batch processes. This matter is being investigated. Due to lack of extensive rainfall during the scheduled sampling period, wet weather sampling was not performed at this regulator.

The other regulator sampled was the Newtown Creek Regulator (No. B-1), a large regulator designed for dry weather flow of approximately 50 MGD. A land use map for this regulator is given in Figure 51, and Table 14 shows demographic characteristics of the drainage basin. This drainage area is approximately 90% residential. The land use map shows that an industrial area immediately surrounds the regulator with residential areas extending outward from the edge of the industrial area. A location plan of the regulator is shown in Figure 52, and Figure 53-A shows the hydraulically operated sluice gate at the regulator while Figure 53-B shows the outfall of the regulator. The results of the 12-hour and 24-hour samplings are given in Tables 15 and 16, respectively.

During the 12-hour sampling conducted on March 1, 1972, the flow was reasonably uniform throughout the day with a slight increase noted at 6 P.M. Flows were estimated (by measuring liquid height) to be approximately 35 MGD during the uniform flow period and approximately 50 MGD at the 6 P.M. peak. No precipitation or bypass flow occurred during sampling. Strong gaseous odors were evident from the overflow line manhole opening during the sampling period. During the 24-hour sampling which occurred on March 8 and 9, 1972, the flow during the day was fairly uniform and comparable to the previous sampling performed on March 1, 1972, with increased flow again occurring at 6 P.M. During the early morning hours of March 8, a light precipitation occurred with a slight overflow being observed at 9 A.M. As with the Bayonne regulator, large variations in pollutant concentrations occurred between daytime, nighttime, and early morning hours. This holds true not only for the parameters of usual interest such as total suspended solids and BOD, but also for many of the heavy metals such as chromimum, nickel, and copper.

The Commission also conducted two wet weather sampling surveys at the Newtown Creek Regulator (No. B-1). Analytical data was developed from the samples taken during two storm periods, April 13 and June 16, 1972. The analytical data for the April 13, 1972, storm is shown in Table 17. The storm flow and pollution loading characteristics during this storm are shown in Table 18, and Figures 54, 55, and 56 show total suspended solids, BOD, and oil and grease concentrations as

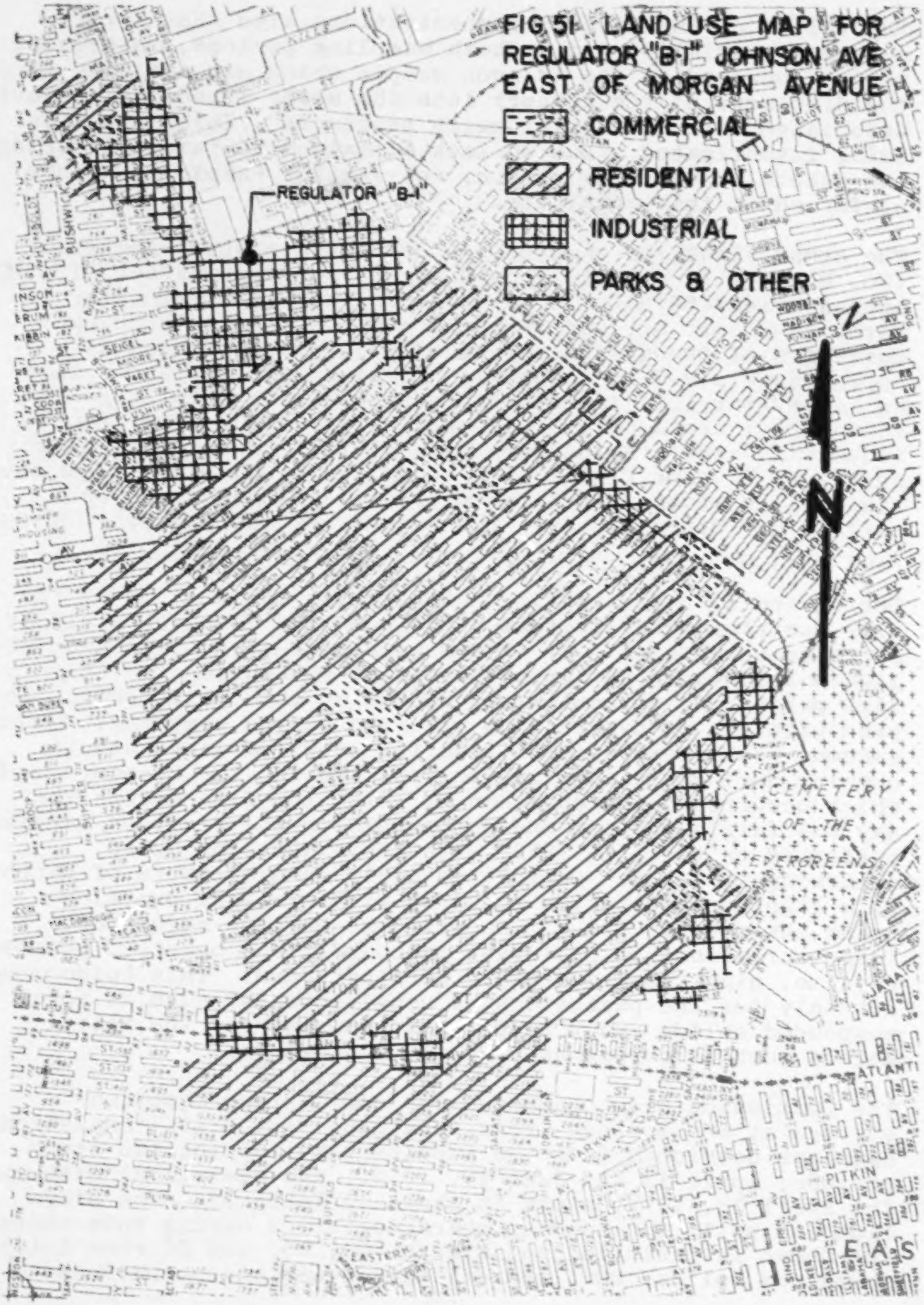

FIG. 51 LAND USE MAP FOR REGULATOR "B-1" JOHNSON AVE EAST OF MORGAN AVENUE

COMMERCIAL
RESIDENTIAL
INDUSTRIAL
PARKS & OTHER
REGULATOR "B-1"
N
CEMETERY OF THE EVERGREENS
BUSHWICK
SEIGEL
MOORE
BUSHWICK HOUSING
MACDOUGAL
DECATUR
ATLANTIC
PITKIN
EASTERN
PARKWAY
JAMAICA
EAS

TABLE 14

LAND USE AND DEMOGRAPHIC CHARACTERISTICS OF DRAINAGE BASIN

(Regulator B-1) (Newtown Creek)

Population	N/A
Area (Acres)	1408
Population Density	--
Land Use	
% residential	80
% commercial	0
% industrial	15
% other	5
Streets	
Total Length (Miles)	83
Estimated number of catch basins	1400

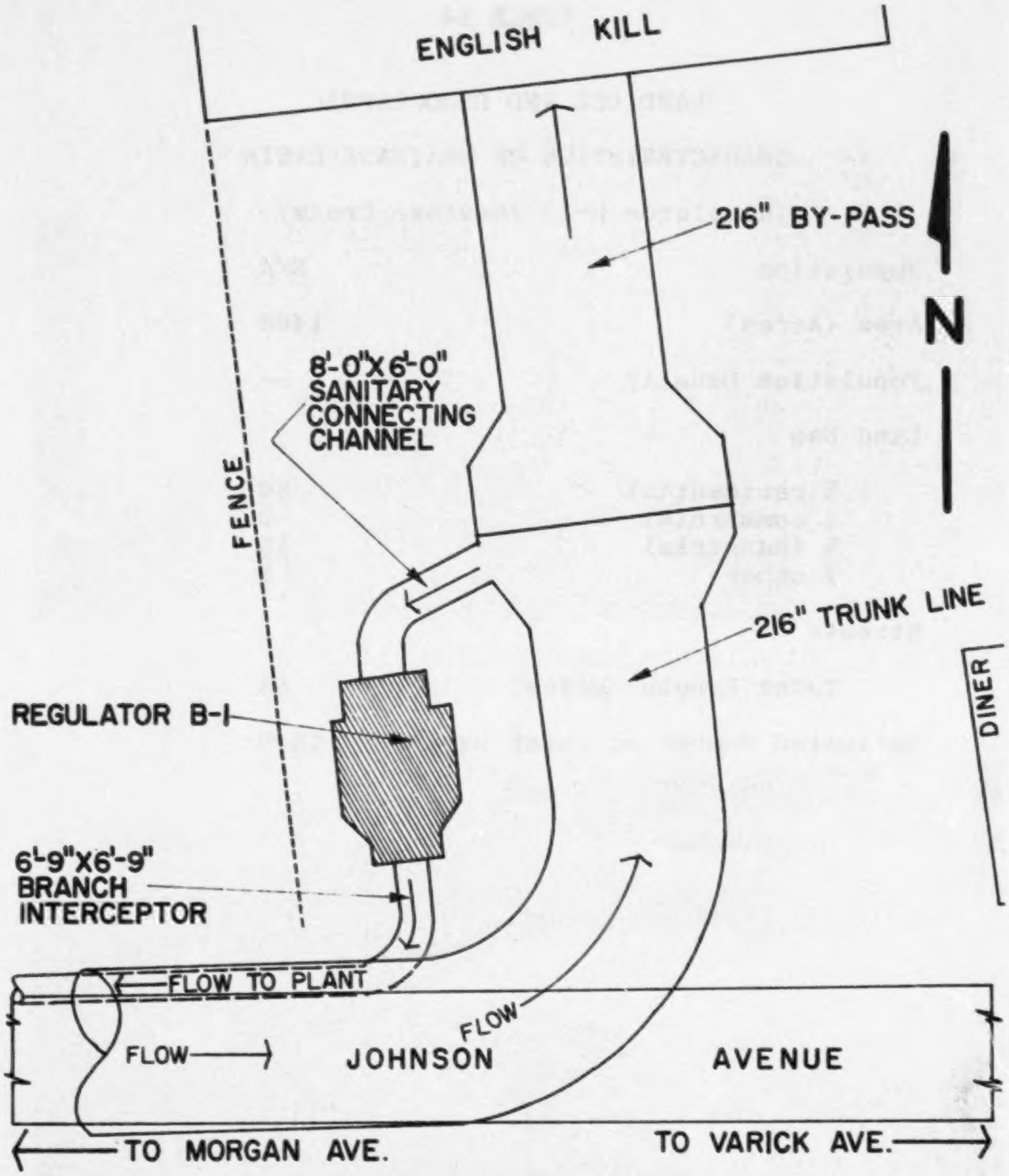
ENGLISH KILL
216" BY-PASS
N
8'-0"X6'-0"
SANITARY
CONNECTING
CHANNEL
FENCE
216" TRUNK LINE
DINER
REGULATOR B-1
6'-9"X6'-9"
BRANCH
INTERCEPTOR
FLOW TO PLANT
FLOW
FLOW
JOHNSON
AVENUE
TO MORGAN AVE.
TO VARICK AVE.

FIG. 52 LOCATION PLAN
REG. B-1 JOHNSON AVENUE
EAST OF MORGAN AVENUE

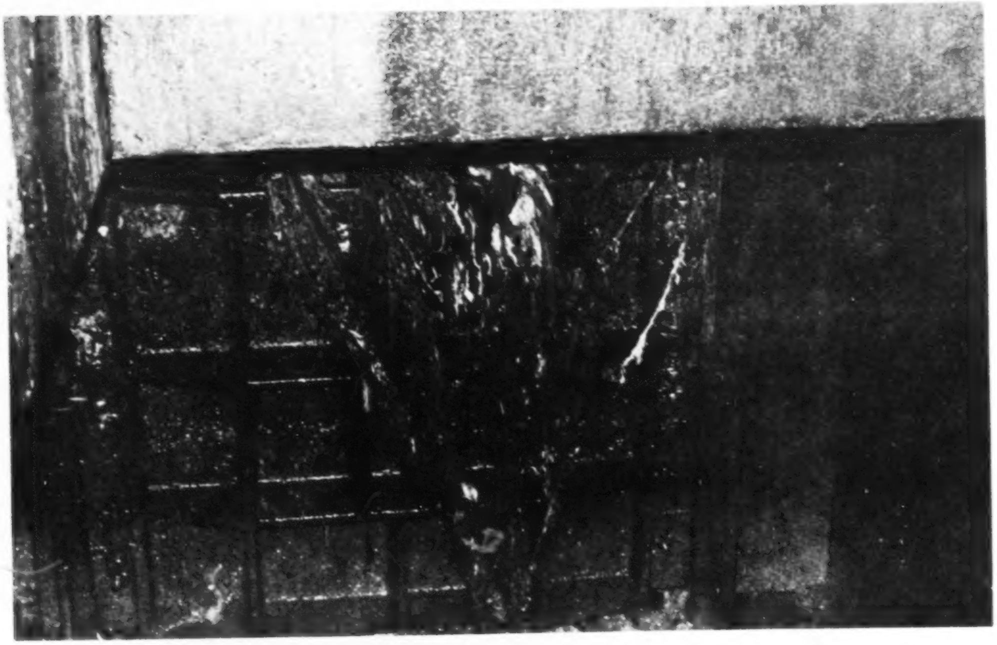

FIG. 53-A, HYDRAULICALLY OPERATED SLUICE GATE AT REGULATOR B-1, JOHNSON AVENUE EAST OF MORGAN AVENUE, BROOKLYN, NEW YORK

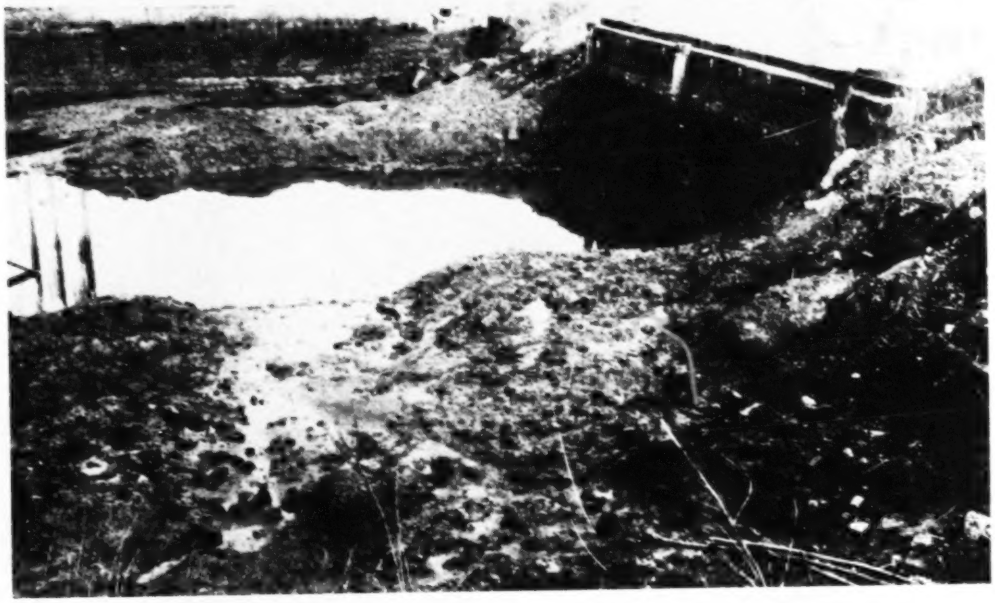

FIG. 53-B, OUTFALL FOR REGULATOR B-1, JOHNSON AVENUE EAST OF MORGAN AVENUE, BROOKLYN, NEW YORK

TABLE 15 - REGULATOR B-1, JOHNSON AVENUE EAST OF MORGAN AVENUE

DRY WEATHER SAMPLING RESULTS FOR MARCH 1, 1972

SUMMARY OF THE ANALYSES OF SAMPLES TAKEN WITHIN
NEWTOWN CREEK DRAINAGE AREA   REGULATOR: B-1
JOHNSON AVENUE EAST OF MORGAN AVENUE
BROOKLYN   NEW YORK

DISCHARGE WATERWAY: NEWTOWN CREEK   I.S.C. WATER CLASSIFICATION: B2

DATE OF SAMPLING: 3/ 1/72   NUMBER OF SAMPLES TAKEN: 6

SAMPLED BY: INTERSTATE SANITATION COMMISSION
ANALYSES PERFORMED BY: INTERSTATE SANITATION COMMISSION
I.S.C. INVESTIGATION NUMBER: 8897

PARAMETER	SAMPLE 1 POINT 1 0900	SAMPLE 2 POINT 1 1200	SAMPLE 3 POINT 1 1500	SAMPLE 4 POINT 1 1800	SAMPLE 5 POINT 1 2100	SAMPLE 6 POINT 1 0900-2100
TOTAL SUSPENDED SOLIDS	185	148	112	92	172	********
SETTLEABLE SOLIDS	69	66	68	56	95	********
COLIFORM DENSITY	********	45000	********	80000	********	********
BIOCHEMICAL OXYGEN DEMAND	214	246	204	183	223	193
TEMPERATURE	15.5	16.0	17.0	15.0	15.5	********
PH	7.6	7.9	8.0	7.5	********	********
CHLORIDES	143	208	177	148	119	161
TOTAL CARBON	150	180	137	95	96	135
TOTAL ORGANIC CARBON	137	168	126	83	84	122
OIL AND GREASE	********	53.1	********	25.8	********	********
TURBIDITY (UNSETTLED SAMPLE) ..	78	76	58	52	********	********
TURBIDITY (SETTLED SAMPLE)	55	67	50	47	********	********
ORTHO PHOSPHATE - P	6.03	3.58	2.83	2.11	1.30	2.96
AMMONIA - N	10.00	7.30	5.50	6.80	4.70	0.60
NITRITE - N	0.27	0.25	0.29	0.18	0.15	0.28
NITRATE - N	1.12	1.05	1.12	0.79	0.60	0.90
COPPER	********	1.75	********	0.45	********	1.30
ZINC	********	1.12	********	0.66	********	0.80
CHROMIUM	********	0.90	********	0.55	********	0.75
LEAD	********	<0.20	********	<0.20	********	<0.20
NICKEL	********	0.70	********	0.04	********	0.04
CADMIUM	********	0.16	********	0.06	********	0.12
MANGANESE	********	0.08	********	0.06	********	0.06
MERCURY	********	********	********	********	********	********
SILVER	********	0.40	********	0.02	********	0.02
COBALT	********	<0.05	********	<0.05	********	<0.05

NOTES:

(1) POINT 1 SAMPLES TAKEN FROM REGULATOR CHAMBER
POINT 2 SAMPLES TAKEN FROM DIVERSION CHAMBER

(2) ALL UNITS ARE MILLIGRAMS PER LITER EXCEPT PH AND THE FOLLOWING:
TEMPERATURE - DEGREES CENTIGRADE
COLIFORM DENSITY - FECAL COLIFORM ORGANISMS PER 100 MILLILITERS
TURBIDITY - JACKSON TURBIDITY UNITS

(3)

SAMPLE	TYPE OF SAMPLE	FLOW TO INTERCEPTOR LINE (APPROX)	
1	DRY WEATHER-GRAB	35	MILLION GALLONS PER DAY
2	DRY WEATHER-GRAB	35	MILLION GALLONS PER DAY
3	DRY WEATHER-GRAB	40	MILLION GALLONS PER DAY
4	DRY WEATHER-GRAB	40	MILLION GALLONS PER DAY
5	DRY WEATHER-GRAB	35	MILLION GALLONS PER DAY
6	DRY WEATHER-COMPOSITE	37	MILLION GALLONS PER DAY

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TABLE 16 - REGULATOR B-1, JOHNSON AVENUE EAST OF MORGAN AVENUE

DRY WEATHER SAMPLING RESULTS FOR MARCH 8, 9, 1972

SUMMARY OF THE ANALYSES OF SAMPLES TAKEN WITHIN
NEWTOWN CREEK DRAINAGE AREA   REGULATOR: B-1
JOHNSON AVENUE EAST OF MORGAN AVENUE
BROOKLYN   NEW YORK

DISCHARGE WATERWAY: NEWTOWN CREEK   I.S.C. WATER CLASSIFICATION: B2

DATE OF SAMPLING: 3/8/72 & 3/9/72   NUMBER OF SAMPLES TAKEN: 11

SAMPLED BY: INTERSTATE SANITATION COMMISSION
ANALYSES PERFORMED BY: INTERSTATE SANITATION COMMISSION
I.S.C. INVESTIGATION NUMBER: 8902

PARAMETER	SAMPLE 1 POINT 1 3/8-0900	SAMPLE 2 POINT 1 3/8-1200	SAMPLE 3 POINT 1 3/8-1500	SAMPLE 4 POINT 1 3/8-1800	SAMPLE 5 POINT 1 3/8-2100	SAMPLE 6 POINT 1 3/8-0900 TO 2100
TOTAL SUSPENDED SOLIDS	168	154	116	194	84	173
SETTLEABLE SOLIDS	78	46	42	82	42	86
COLIFORM DENSITY	*********	<1000	*********	3000	*********	*********
BIOCHEMICAL OXYGEN DEMAND	153	139	253	224	192	189
TEMPERATURE	14.0	14.0	16.0	16.0	15.5	*********
PH	6.7	6.9	9.2	7.9	7.2	*********
CHLORIDES	*********	*********	*********	*********	*********	*********
TOTAL CARBON	87	82	167	148	83	100
TOTAL ORGANIC CARBON	77	73	151	140	72	89
OIL AND GREASE	*********	26.4	*********	31.6	*********	*********
TURBIDITY(UNSETTLED SAMPLE)	55	57	60	69	58	60
TURBIDITY(SETTLED SAMPLE)	44	47	52	62	54	47
ORTHO PHOSPHATE - P	2.47	2.11	2.47	2.60	2.60	2.47
AMMONIA - N	6.80	5.20	6.70	7.10	8.20	7.30
NITRITE - N	0.18	0.18	0.20	0.15	0.15	0.29
NITRATE - N	0.85	0.79	0.75	0.56	0.62	0.77
COPPER	*********	1.00	*********	8.90	*********	2.20
ZINC	*********	0.76	*********	0.64	*********	0.66
CHROMIUM	*********	1.95	*********	0.65	*********	0.75
LEAD	*********	<0.20	*********	<0.20	*********	<0.20
NICKEL	*********	0.80	*********	0.50	*********	0.30
CADMIUM	*********	0.08	*********	0.06	*********	0.10
MANGANESE	*********	0.08	*********	0.06	*********	0.08
MERCURY	*********	<0.0001	*********	<0.0001	*********	<0.0001
SILVER	*********	<0.05	*********	<0.05	*********	<0.05
COBALT	*********	<0.05	*********	<0.05	*********	<0.05

TABLE 16 - (CONTINUED)

PARAMETER	SAMPLE 7 POINT 1 3/8-2400	SAMPLE 8 POINT 1 3/9-0300	SAMPLE 9 POINT 1 3/9-0600	SAMPLE 10 POINT 1 3/9-0900	SAMPLE 11 POINT 1 3/8-2100 TO 3/9-0900
TOTAL SUSPENDED SOLIDS	46	26	38	143	87
SETTLEABLE SOLIDS	12	6	10	35	19
COLOFORM DENSITY	>100000	********	>100000	>100000	********
BIOCHEMICAL OXYGEN DEMAND	110	39	43	172	102
TEMPERATURE	14.0	12.0	11.0	11.5	********
PH	7.3	7.9	5.6	********	********
CHLORIDES	********	********	********	********	********
TOTAL CARBON	67	41	32	99	64
TOTAL ORGANIC CARBON	56	31	28	91	56
OIL AND GREASE	12.3	********	9.0	********	********
TURBIDITY(UNSETTLED SAMPLE)	38	21	********	77	45
TURBIDITY(SETTLED SAMPLE).......	32	16	********	75	42
ORTHO PHOSPHATE - P	1.85	1.53	<0.01	2.60	0.71
AMMONIA - N	7.60	4.80	6.40	13.10	10.90
NITRITE - N	0.16	0.13	0.15	0.10	0.22
NITRATE - N	0.56	0.60	0.58	0.90	0.52
COPPER	0.15	********	0.10	********	0.15
ZINC	0.64	********	0.78	********	0.70
CHROMIUM	0.15	********	0.10	********	0.20
LEAD	<0.20	********	<0.20	********	<0.20
NICKEL	0.10	********	<0.10	********	0.10
CADMIUM	0.08	********	0.10	********	0.10
MANGANESE	0.04	********	0.10	********	0.06
MERCURY	<0.0001	********	<0.0001	********	0.0004
SILVER	<0.05	********	<0.05	********	<0.05
COBALT	<0.05	********	<0.05	********	<0.05

NOTES:

(1) POINT 1 SAMPLES TAKEN FROM REGULATOR CHAMBER
POINT 2 SAMPLES TAKEN FROM DIVERSION CHAMBER

(2) ALL UNITS ARE MILLIGRAMS PER LITER EXCEPT PH AND THE FOLLOWING:
TEMPERATURE - DEGREES CENTIGRADE
COLIFORM DENSITY - FECAL COLIFORM ORGANISMS PER 100 MILLILITERS
TURBIDITY - JACKSON TURBIDITY UNITS

(3)

SAMPLE	TYPE OF SAMPLE	FLOW TO INTERCEPTOR LINE (APPROX)
1	DRY WEATHER-GRAB	50 MILLION GALLONS PER DAY
2	DRY WEATHER-GRAB	40 MILLION GALLONS PER DAY
3	DRY WEATHER-GRAB	35 MILLION GALLONS PER DAY
4	DRY WEATHER-GRAB	35 MILLION GALLONS PER DAY
5	DRY WEATHER-GRAB	30 MILLION GALLONS PER DAY
6	DRY WEATHER - COMPOSITE	42 MILLION GALLONS PER DAY
7	DRY WEATHER-GRAB	30 MILLION GALLONS PER DAY
8	DRY WEATHER-GRAB	30 MILLION GALLONS PER DAY
9	DRY WEATHER-GRAB	30 MILLION GALLONS PER DAY
10	DRY WEATHER-GRAB	35 MILLION GALLONS PER DAY
11	DRY WEATHER-COMPOSITE	31 MILLION GALLONS PER DAY

TABLE 17 - REGULATOR B-1, JOHNSON AVENUE EAST OF MORGAN AVENUE

WET WEATHER SAMPLING RESULTS FOR APRIL 13, 1972

SUMMARY OF THE ANALYSES OF SAMPLES TAKEN WITHIN
NEWTOWN CREEK DRAINAGE AREA   REGULATOR: B1
JOHNSON AVENUE EAST OF MORGAN AVENUE
BROOKLYN   NEW YORK

DISCHARGE WATERWAY: NEWTOWN CREEK   I.S.C. WATER CLASSIFICATION: B2

DATE OF SAMPLING: 4/13/72   NUMBER OF SAMPLES TAKEN: 12

SAMPLED BY: INTERSTATE SANITATION COMMISSION
ANALYSES PERFORMED BY: INTERSTATE SANITATION COMMISSION
I.S.C. INVESTIGATION NUMBER: 8954

PARAMETER	SAMPLE 1 POINT 2 1035	SAMPLE 2 POINT 2 1045	SAMPLE 3 POINT 2 1055	SAMPLE 4 POINT 2 1110	SAMPLE 5 POINT 2 1125	SAMPLE 6 POINT 2 1155
TOTAL SUSPENDED SOLIDS	1595	8759	1831	564	388	323
SETTLEABLE SOLIDS	1522	8646	1759	497	274	201
COLOFORM DENSITY	********	********	********	********	********	********
BIOCHEMICAL OXYGEN DEMAND	242	428	275	215	186	123
TEMPERATURE	********	********	********	********	********	********
PH	********	********	********	********	********	********
CHLORIDES	32	37	39	39	41	32
TOTAL CARBON	6	12	8	7	7	4
TOTAL ORGANIC CARBON	4	11	8	7	6	3
OIL AND GREASE	46.7	8970.9	1031.3	163.4	********	********
TURBIDITY(UNSETTLED SAMPLE)	70	98	65	61	80	65
TURBIDITY(SETTLED SAMPLE)	45	60	44	45	50	41
ORTHO PHOSPHATE - P	********	********	********	********	********	********
AMMONIA - N	********	********	********	********	********	********
NITRITE - N	********	********	********	********	********	********
NITRATE - N	********	********	********	********	********	********
COPPER	0.30	0.30	0.30	0.30	********	0.20
ZINC	0.54	0.82	0.82	0.70	********	0.44
CHROMIUM	0.40	0.35	0.55	0.50	********	0.35
LEAD	0.40	1.40	0.40	0.20	********	0.20
NICKEL	0.20	0.20	0.30	0.30	********	0.20
CADMIUM	0.06	0.08	0.08	0.06	********	0.06
MANGANESE	0.06	0.12	0.08	0.08	********	0.06
MERCURY	0.0046	0.0023	0.0016	0.0028	********	0.0007
SILVER	<0.05	<0.05	<0.05	<0.05	********	<0.05
COBALT	<0.05	<0.05	<0.05	<0.05	********	<0.05

TABLE 17 - (CONTINUED)

PARAMETER	SAMPLE 7 POINT 2 1225	SAMPLE 8 POINT 2 1255	SAMPLE 9 POINT 2 1325	SAMPLE 10 POINT 2 1425	SAMPLE 11 POINT 2 1525	SAMPLE 12 POINT 2 1655
TOTAL SUSPENDED SOLIDS	214	248	237	135	132	157
SETTLEABLE SOLIDS	146	181	169	80	80	67
COLIFORM DENSITY	********	********	********	********	********	********
BIOCHEMICAL OXYGEN DEMAND	120	86	145	158	163	143
TEMPERATURE	********	********	********	********	********	********
PH	********	********	********	********	********	********
CHLORIDES	32	32	61	62	59	114
TOTAL CARBON	7	4	8	11	11	11
TOTAL ORGANIC CARBON	6	3	8	11	11	11
OIL AND GREASE	********	********	********	********	********	********
TURBIDITY(UNSETTLED SAMPLE)....	50	50	53	52	46	82
TURBIDITY(SETTLED SAMPLE)......	32	34	44	43	40	67
ORTHO PHOSPHATE - P	********	********	********	********	********	********
AMMONIA - N	********	********	********	********	********	********
NITRITE - N	********	********	********	********	********	********
NITRATE - N	********	********	********	********	********	********
COPPER	********	0.15	********	0.55	********	0.85
ZINC	********	0.26	********	0.98	********	1.16
CHROMIUM	********	0.25	********	1.15	********	1.35
LEAD	********	<0.20	********	<0.20	********	0.20
NICKEL	********	0.20	********	0.70	********	0.80
CADMIUM	********	<0.02	********	0.16	********	0.16
MANGANESE	********	0.04	********	0.08	********	0.08
MERCURY	********	0.0004	********	0.0007	********	0.0004
SILVER	********	<0.05	********	<0.05	********	<0.05
COBALT	********	<0.05	********	<0.05	********	<0.05

NOTES:

(1) POINT 1 SAMPLES TAKEN FROM REGULATOR CHAMBER
POINT 2 SAMPLES TAKEN FROM DIVERSION CHAMBER

(2) ALL UNITS ARE MILLIGRAMS PER LITER EXCEPT PH AND THE FOLLOWING:
TEMPERATURE - DEGREES CENTIGRADE
COLIFORM DENSITY - FECAL COLIFORM ORGANISMS PER 100 MILLILITERS
TURBIDITY - JACKSON TURBIDITY UNITS

(3)

SAMPLE	TYPE OF SAMPLE	FLOW TO RECEIVING WATERWAY (APPROX)
1	WET WEATHER-GRAB	43 MILLION GALLONS PER DAY
2	WET WEATHER-GRAB	53 MILLION GALLONS PER DAY
3	WET WEATHER-GRAB	63 MILLION GALLONS PER DAY
4	WET WEATHER-GRAB	80 MILLION GALLONS PER DAY
5	WET WEATHER-GRAB	95 MILLION GALLONS PER DAY
6	WET WEATHER-GRAB	119 MILLION GALLONS PER DAY
7	WET WEATHER-GRAB	130 MILLION GALLONS PER DAY
8	WET WEATHER-GRAB	121 MILLION GALLONS PER DAY
9	WET WEATHER-GRAB	88 MILLION GALLONS PER DAY
10	WET WEATHER-GRAB	23 MILLION GALLONS PER DAY
11	WET WEATHER-GRAB	(SEE NOTE 4)
12	WET WEATHER-GRAB	(SEE NOTE 4)

(4) NO BY-PASS: FLOW IN DIVERSION CHAMBER THROUGH REGULATOR TO INTERCEPTOR LINE

TABLE 18 REGULATOR B-1, JOHNSON AVE. EAST OF MORGAN AVE.

STORM FLOW AND POLLUTION LOADING CHARACTERISTICS DURING STORM OF APRIL 13, 1972

Sample Number	Time (E.S.T.)	Interval (Min.)	Avg. Dry Weather Flow (CFS)	Runoff (CFS)	Total Flow (CFS)	By-Pass⁺ (CFS)	By-Pass (MGD)	Avg. By-Pass During Interval (MGD)	T.S.S. (Mg/L)	Avg. T.S.S. During Interval (Mg/L)	T.S.S. (Lbs.)	B.O.D. (Mg/L)	Avg. B.O.D. During Interval (Mg/L)	B.O.D. (Lbs.)	Oil and Grease (Mg/L)	Avg. Oil & Grease During Interval (Mg/L)	Oil and Grease (Lbs.)
-	1005		60	56	116	0	0		425*			210*			36*		
		30						13		1010	2269		226	508		42	94
1	1035		60	94	154	38	25		1595			242			47		
		10						31		5177	9244		335	598		4509	8051
2	1045		60	112	172	56	36		8759			428			8971		
		10						39		5305	11917		352	791		5001	11234
3	1055		60	120	180	64	41		1851			275			1031		
		15						50		1208	5219		245	1058		597	2579
4	1110		60	146	206	90	58		564			215			163		
		15						64		476	2632		201	1111		137	758
5	1125		59	165	224	108	70		388			186			110*		
		30						85		356	5229		155	2277		83	1219
6	1155		59	111	270	154	100		323			123			55*		
		30						111		269	5160		122	2340		47	901
7	1225		58	247	305	189	122		214			120			38*		
		30						126		231	5030		103	2243		38	827
8	1255		58	258	316	200	129		248			86			37*		
		30						122		243	5123		116	2445		37	780
9	1325		58	241	293	177	115		237			145			36*		
		60						84		186	5400		152	4413		35	1016
10	1425		58	138	196	80	52		135			158			34*		
		60						26		134	1204		162	1456		33	297
11	1525		56	60	116	0	0		132			163			32*		
		90						-		145	-		153	-		31	-
12	1655		56	20	76	. . . (SEE NOTE A) . . .			157			143			29*		
						Total By-Pass Loading					58,427			19,240			27,756

NOTES:

⁺Regulator Capacity is estimated to be 116 CFS. By-Pass (CFS) = Total Flow (CFS) - Regulator Capacity (CFS).

*Value obtained from extrapolated data.

A) No By-Pass - Flow in diversion chamber passing through regulator to interceptor line.

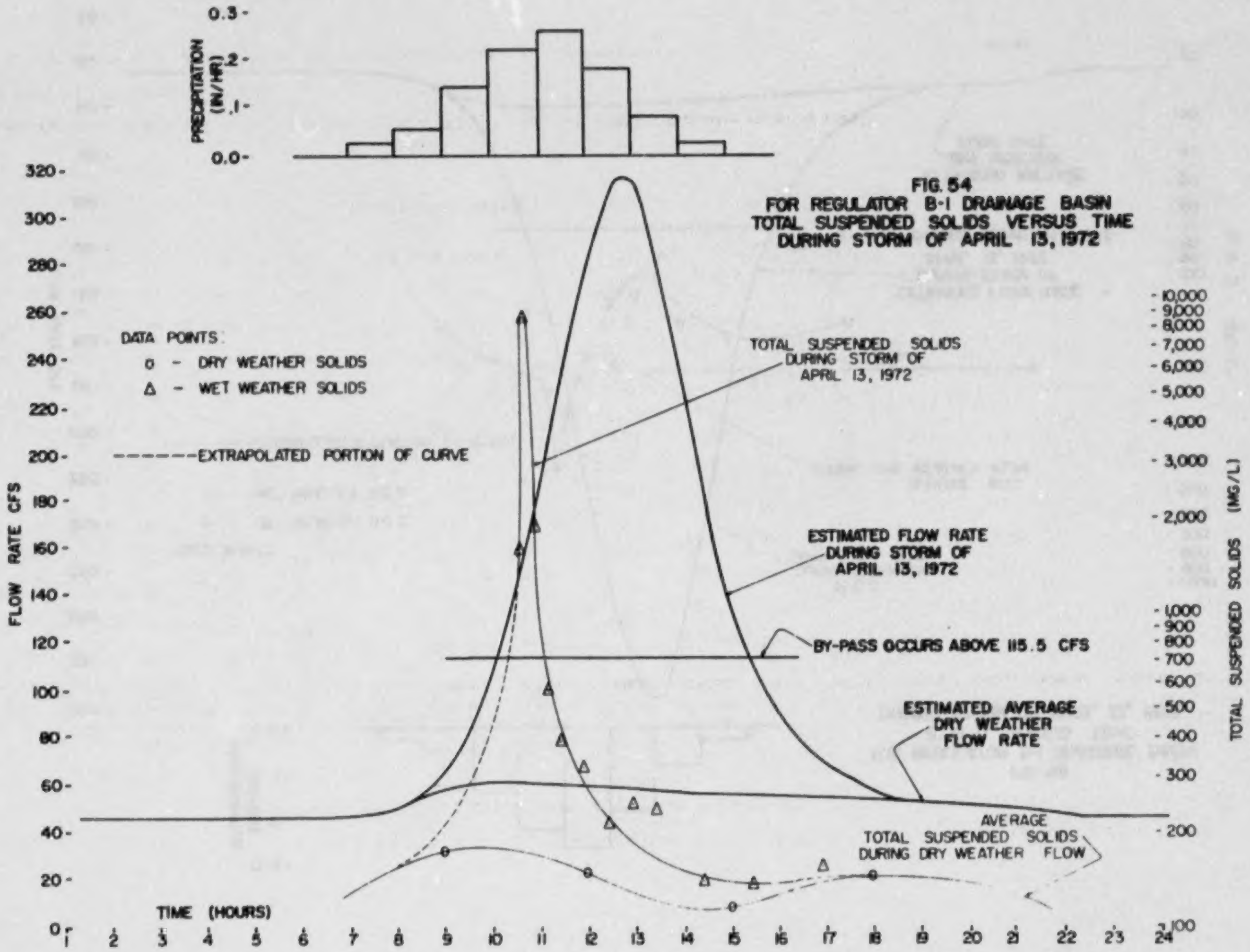

FIG. 54
FOR REGULATOR B-1 DRAINAGE BASIN
TOTAL SUSPENDED SOLIDS VERSUS TIME
DURING STORM OF APRIL 13, 1972

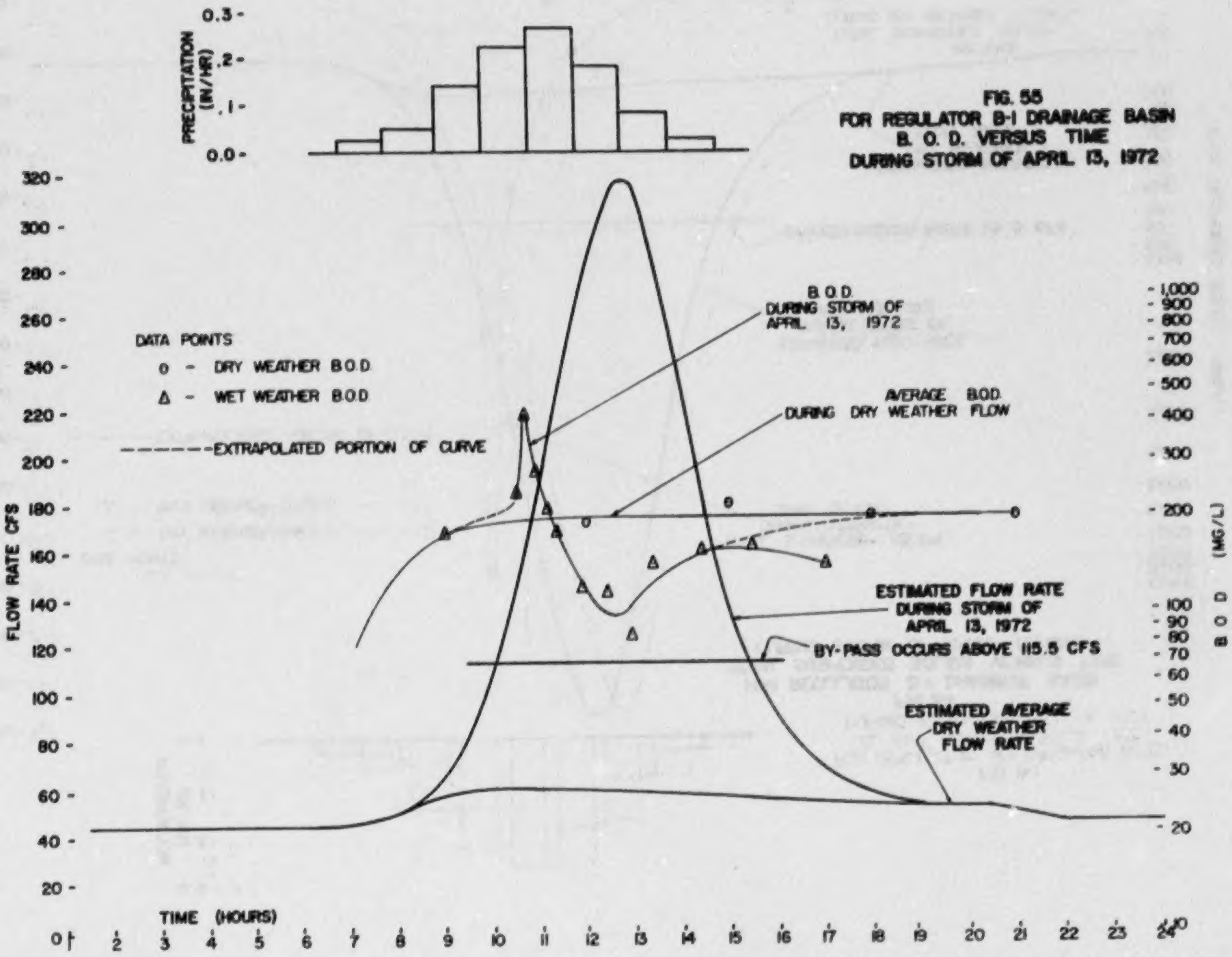
FIG. 55
FOR REGULATOR B-1 DRAINAGE BASIN
B. O. D. VERSUS TIME
DURING STORM OF APRIL 13, 1972

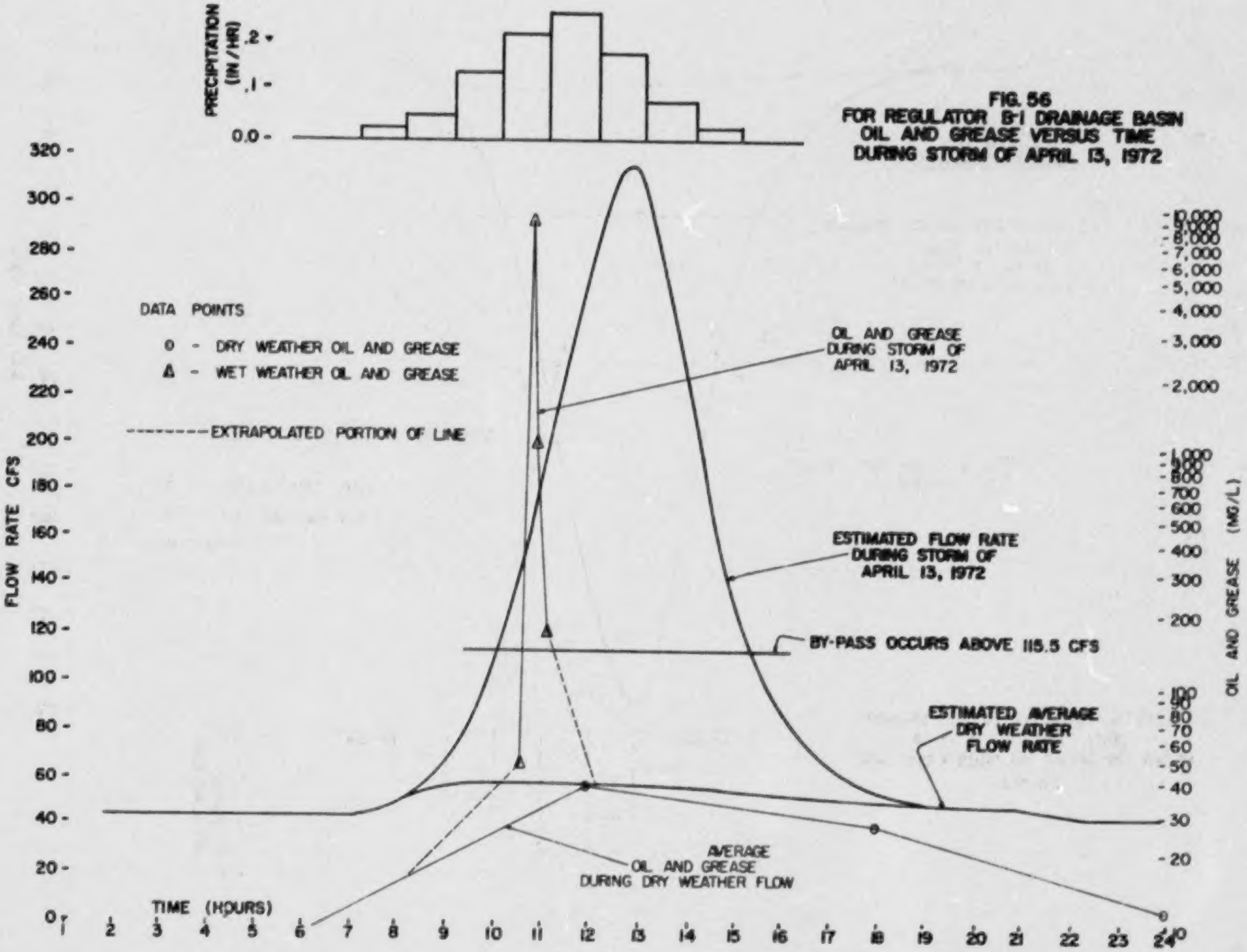

FIG. 56
FOR REGULATOR B-1 DRAINAGE BASIN
OIL AND GREASE VERSUS TIME
DURING STORM OF APRIL 13, 1972

a function of time, respectively. An explanation of the column headings and the method of calculation for the various columns in Table 18 are found in Appendix B. Appendix D also lists the terms used in Tables 18 and 20.

Analytical data for the storm that occurred on June 16, 1972, is presented in Table 19. The storm flow and pollution loading characteristics of the storm are given in Table 20 and the total suspended solids, BOD, and oil and grease concentrations are given as a function of time in Figures 57, 58, and 59, respectively.

Estimates of storm runoff for both storm periods were calculated using the rational method. This method probably is the most prevalant one currently used in the United States to estimate the quantities of storm water runoff (23, 24). The rational formula relates runoff to rainfall in the following manner:

$$Q = CIA$$

where:
Q = peak runoff
C = runoff coefficient
I = average rainfall intensity
A = drainage area

The runoff coefficient "C", is the least known quantity in the rational equation. It is not easily determined since it includes the effects of several variables such as infiltration capacity, interception by vegetation, and storage in depressions or rooftops. The coefficient represents a fixed ratio of runoff to rainfall in the equation but in reality it varies as a function of time during a storm, from storm to storm, and with the seasons.

Presently, there is no precise method for evaluating the runoff coefficient, although studies have been reported in this area (25). Common engineering practice is to utilize average values of the coefficient for various surface conditions. Values of the coefficient reported in the literature (23, 26, 27, 28) for urban areas range from 0.70 - 0.95. It should be noted that in highly urbanized regions with high percentages of impervious surfaces, the choice of "C" becomes more reasonable as "C" approaches unity and the application of the rational method becomes more suitable.

During this study, the initial value of the runoff coefficient was chosen to be 0.55 (a conservative value) and was incremented by 0.04 for each hour of rainfall to account for further runoff following saturation of the surface. The total flow during each increment was determined by

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TABLE 19 - REGULATOR B-1, JOHNSON AVENUE EAST OF MORGAN AVENUE

WET WEATHER SAMPLING RESULTS FOR JUNE 16, 1972

SUMMARY OF THE ANALYSIS OF SAMPLES TAKEN WITHIN
NEWTOWN CREEK DRAINAGE AREA   REGULATOR: B-1
JOHNSON AVENUE EAST OF MORGAN AVENUE
BROOKLYN   NEW YORK

DISCHARGE WATERWAY: NEWTOWN CREEK   I.S.C. WATER CLASSIFICATION: B2

DATE OF SAMPLING: 6/16/72   NUMBER OF SAMPLES TAKEN: 8

SAMPLED BY: INTERSTATE SANITATION COMMISSION
ANALYSES PERFORMED BY: INTERSTATE SANITATION COMMISSION
I.S.C. INVESTIGATION NUMBER: 9035

PARAMETER	SAMPLE 1 POINT 2 1540	SAMPLE 2 POINT 2 1550	SAMPLE 3 POINT 2 1600	SAMPLE 4 POINT 2 1610
TOTAL SUSPENDED SOLIDS	531	16804	2312	20244
SETTLEABLE SOLIDS	486	16726	2144	20157
COLIFORM DENSITY	********	********	********	********
BIOCHEMICAL OXYGEN DEMAND	173	321	465	272
TEMPERATURE	********	********	********	********
PH	********	********	********	********
CHLORIDES	32	35	50	29
TOTAL CARBON	********	********	********	********
TOTAL ORGANIC CARBON	********	********	********	********
OIL AND GREASE	110	4314	248	1216
TURBIDITY (UNSETTLED SAMPLE) ...	75	92	110	83
TURBIDITY (SETTLED SAMPLE)	40	50	110	59
ORTHO PHOSPHATE - P	********	********	********	********
AMMONIA - N	********	********	********	********
NITRITE - N	********	********	********	********
NITRATE - N	********	********	********	********
COPPER	0.66	0.72	1.49	1.13
ZINC	1.48	2.09	1.65	2.25
CHROMIUM	1.08	0.88	1.21	1.42
LEAD	0.80	1.00	0.80	1.40
NICKEL	0.90	1.30	1.70	1.90
CADMIUM	0.03	0.08	0.36	0.28
MANGANESE	0.15	0.22	0.24	0.22
MERCURY	0.0020	0.0006	0.0010	0.0074
SILVER	********	********	********	********
COBALT	********	********	********	********

TABLE 19 - (CONTINUED)

PARAMETER	SAMPLE 5 POINT 2 1625	SAMPLE 6 POINT 2 1640	SAMPLE 7 POINT 2 1710	SAMPLE 8 POINT 2 1730
TOTAL SUSPENDED SOLIDS	7604	1128	420	130
SETTLEABLE SOLIDS	7534	1061	383	99
COLIFORM DENSITY	********	********	********	********
BIOCHEMICAL OXYGEN DEMAND	199	148	82	87
TEMPERATURE	********	********	********	********
PH	********	********	********	********
CHLORIDES	18	16	24	21
TOTAL CARBON	********	********	********	********
TOTAL ORGANIC CARBON	********	********	********	********
OIL AND GREASE	********	1008	********	47
TURBIDITY (UNSETTLED SAMPLE)....	84	72	50	45
TURBIDITY (SETTLED SAMPLE)......	39	40	26	25
ORTHO PHOSPHATE - P	********	********	********	********
AMMONIA - N	********	********	********	********
NITRATE - N	********	********	********	********
NITRATE - N	********	********	********	********
COOPER	0.67	0.69	0.25	0.25
ZINC	1.55	1.66	0.83	0.71
CHROMIUM	1.17	1.13	0.37	0.21
LEAD	0.70	1.10	0.40	0.40
NICKEL	0.40	0.40	0.30	0.05
CADMIUM	0.13	0.13	0.03	0.03
MANGANESE	0.14	0.18	0.10	0.07
MERCURY	0.0034	0.0023	0.0015	0.0014
SILVER	********	********	********	********
COBALT	********	********	********	********

NOTES:

(1) POINT 1 SAMPLES TAKEN FROM REGULATOR CHAMBER
POINT 2 SAMPLES TAKEN FROM DIVERSION CHAMBER

(2) ALL UNITS ARE MILLIGRAMS PER LITER EXCEPT PH AND THE FOLLOWING:
TEMPERATURE - DEGREES CENTIGRADE
COLIFORM DENSITY - FECAL COLIFORM ORGANISMS PER 100 MILLILITERS
TURBIDITY - JACKSON TURBIDITY UNITS

(3)

SAMPLE	TYPE OF SAMPLE	FLOW TO RECEIVING WATERWAY (APPROX)
1	WET WEATHER-GRAB	289 MILLION GALLONS PER DAY
2	WET WEATHER-GRAB	287 MILLION GALLONS PER DAY
3	WET WEATHER-GRAB	286 MILLION GALLONS PER DAY
4	WET WEATHER-GRAB	284 MILLION GALLONS PER DAY
5	WET WEATHER-GRAB	278 MILLION GALLONS PER DAY
6	WET WEATHER-GRAB	267 MILLION GALLONS PER DAY
7	WET WEATHER-GRAB	32 MILLION GALLONS PER DAY
8	WET WEATHER-GRAB	1 MILLION GALLONS PER DAY

TABLE 20 - REGULATOR B-1, JOHNSON AVE. EAST OF MORGAN AVE.

STORM FLOW AND POLLUTION LOADING CHARACTERISTICS DURING STORM OF JUNE 16, 1972

Sample Number	Time (E.S.T.)	Interval (Min.)	Total Flow (CFS)	By-Pass Flow (CFS)[+]	By-Pass Flow (MGD)	Avg. By-Pass During Interval (MGD)	T.S.S. (Mg/L)	Avg. T.S.S. During Interval (Mg/L)	T.S.S. (Lbs.)	B.O.D. Mg/L)	Avg. B.O.D. During Interval (Mg/L)	B.O.D (Lbs.)	Oil and Grease (Mg/L)	Avg. Oil & Grease During Interval (Mg/L)	Oil and Grease (Lbs.)
-	1530		100	-	-	-	120*			80*			33*		
		10				21		326	394		127	154		72	87
1	1540		180	64	41		531			173			110		
		10				149		8668	74392		247	2120		2212	18984
2	1550		512	396	256		16804			321			4314		
		10				265		17664	269623		393	5999		3157	48186
3	1600		540	424	274		18524**			465			2000**		
		10				278		19384	310392		369	5909		1590	25460
4	1610		552	436	282		20244			272			1180		
		15				285		13924	342865		236	5811		1140	28071
5	1625		560	444	287		7604			199			1100		
		15				286		4366	107886		174	4300		1054	26045
6	1640		556	440	285		1128			148			1008		
		30				280		774	37449		115	5564		584	28256
7	1710		540	424	274		420			82			160**		
		20				265		275	8395		85	2595		104	3175
8	1730		512	396	256		130			87			47		
		50				128		130	4792		90	3318		37	1364
-	1820		116	0	0		130*			115*			27*		
Total By-Pass Loading									1,156,188			35,770			179,630

NOTES:

[+] Regulator Capacity is estimated to be 116 CFS. By-Pass (CFS) = Total Flow (CFS) - Regulator Capacity (CFS).

*Extrapolated Value

**Interpolated Value

A) Average Dry Weather Flow: 55-60 CFS during this period.

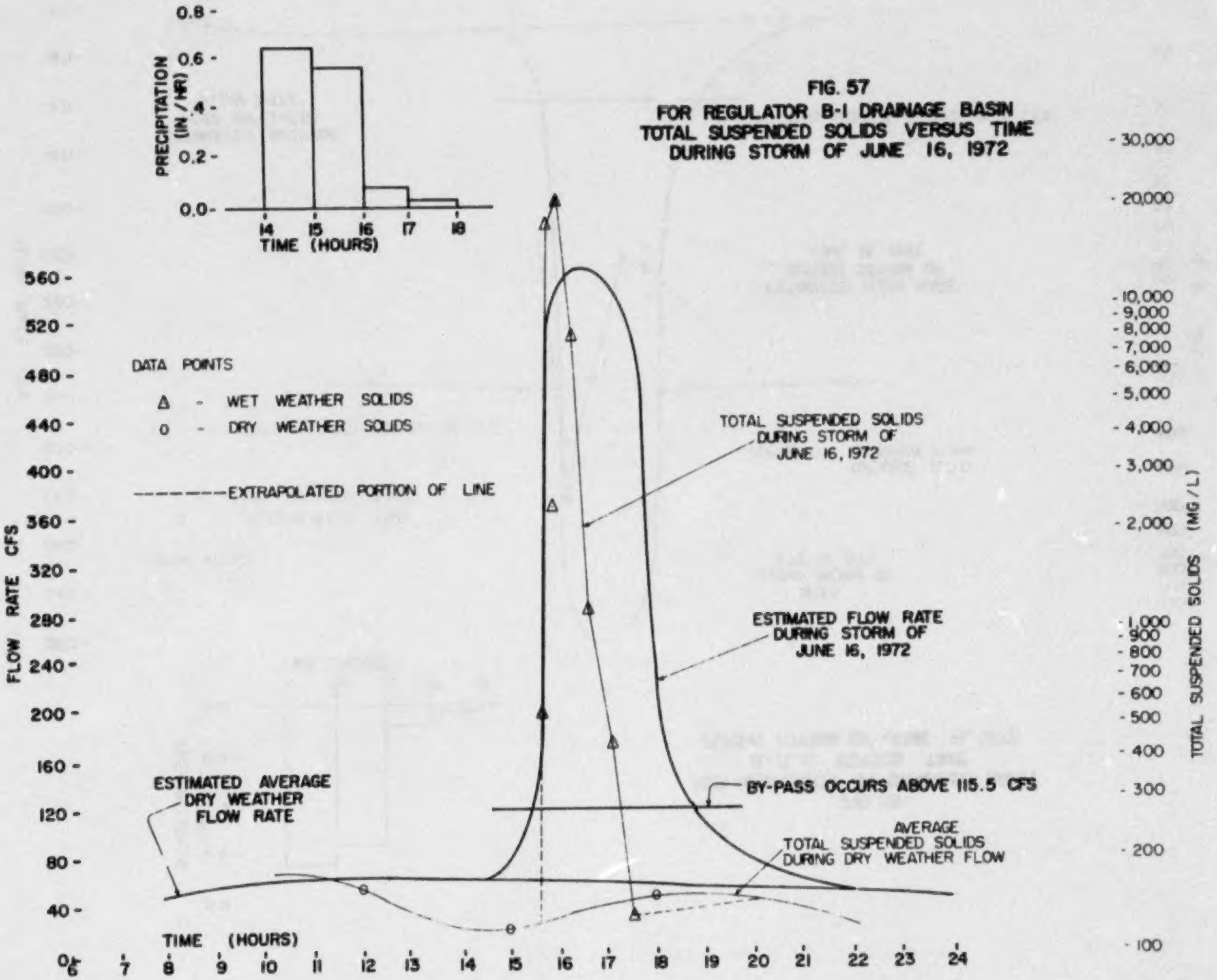

FIG. 57
FOR REGULATOR B-1 DRAINAGE BASIN TOTAL SUSPENDED SOLIDS VERSUS TIME DURING STORM OF JUNE 16, 1972

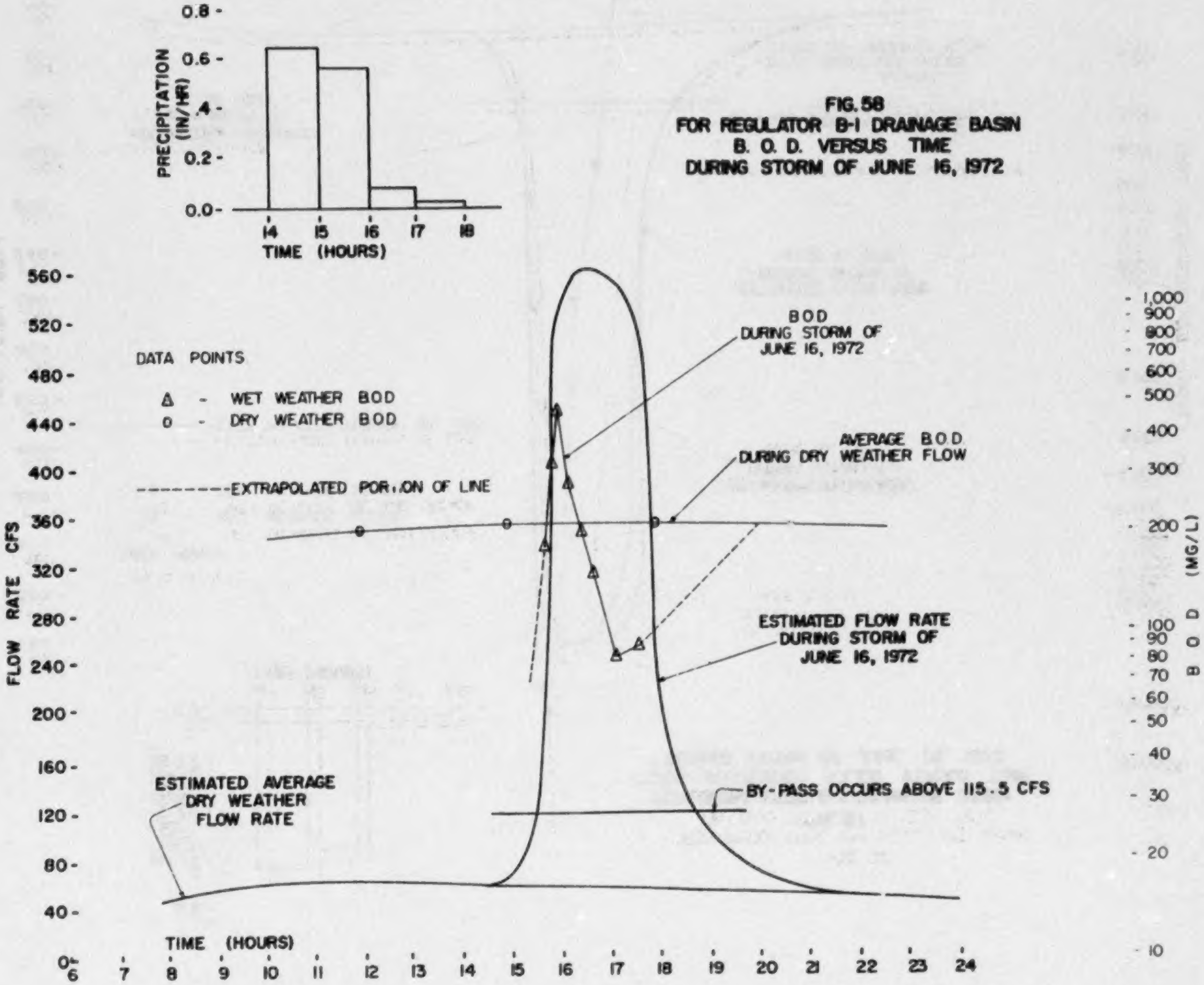

FIG. 58
FOR REGULATOR B-1 DRAINAGE BASIN
B. O. D. VERSUS TIME
DURING STORM OF JUNE 16, 1972

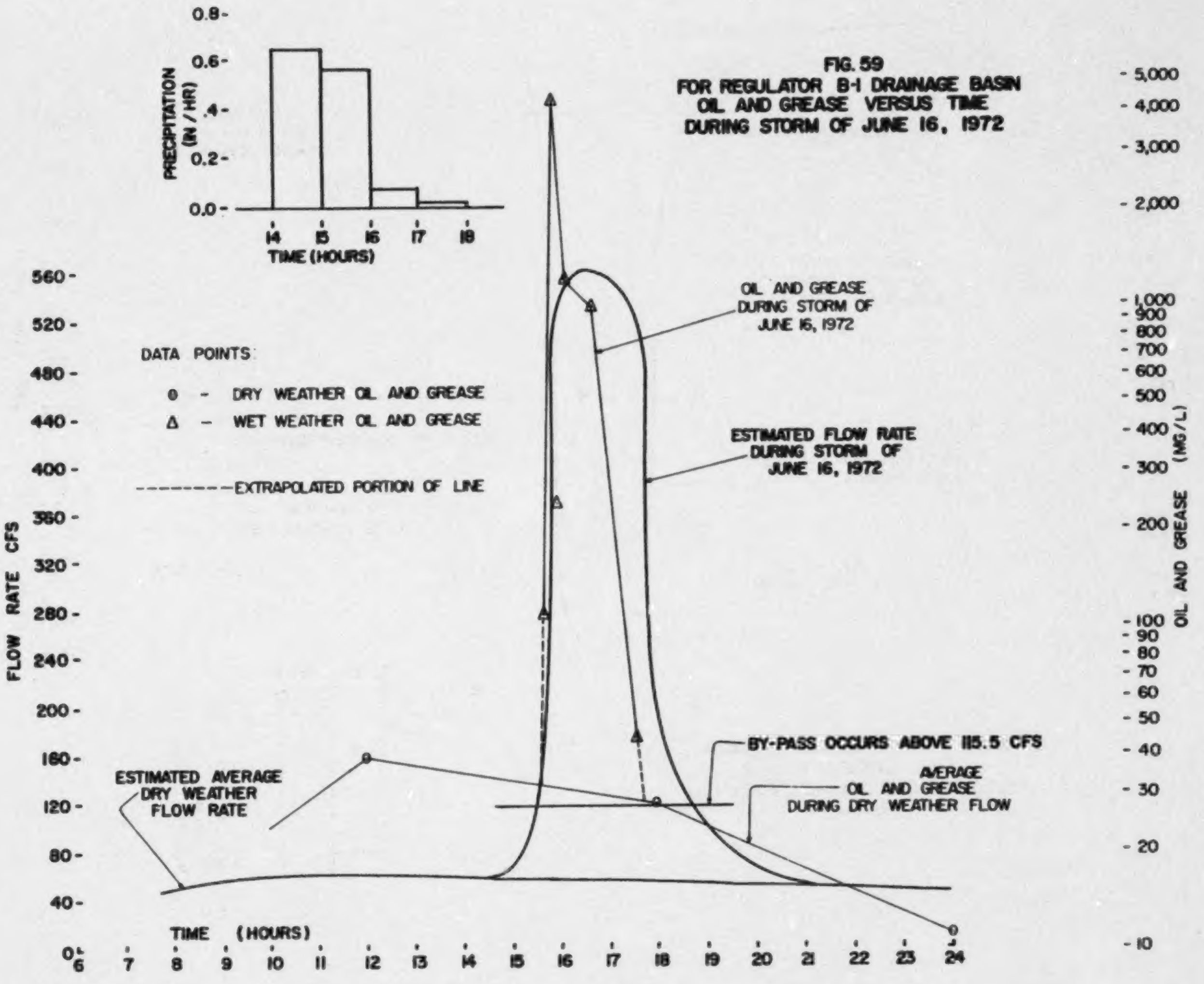

FIG. 59
FOR REGULATOR B-1 DRAINAGE BASIN
OIL AND GREASE VERSUS TIME
DURING STORM OF JUNE 16, 1972

calculating the runoff flow using the rational equation and adding to that value the mean dry weather flow. A plot of these points versus time determined the shape of the total flow curve during each of the two storms studied. The placement of the total flow curve on the time axis was based upon the time of the observed initial bypass flow. The initial bypass was estimated to occur at 1.5 times the design mean dry weather flow of 50 million gallons a day through the regulator. Actually, there was a slight difference between the observed time of initial bypass and the theoretical time of bypass based upon runoff calculations. This is probably due to the fact that the rainfall data for the storms were obtained at the National Weather Service station at Central Park, a distance of approximately five miles from this regulator.

The total quantity of bypass for each storm was obtained by numerically integrating the function represented by the difference between total flow and initial bypass flow.

The two storms that were sampled were of distinctly different characteristics. During the storm which occurred on April 13, 1972, 0.97 inches of rain fell over a 9-hour period with a peak intensity between 11 A.M. and 12 noon EST of 0.26 inches per hour. As can be seen on Figure 54, the hydrograph of the rainfall approximates a normal distribution and may be considered to be typical of a spring day-long rain storm. The storm previous to this occurred on April 4, more than a week prior, during which 0.31 inches of rain fell.

The storm which occurred on June 16, 1972, was of a completely different nature. During this storm, a total of 1.31 inches of rain fell and as can be seen from the hydrograph on Figure 57, the total rainfall occurred over a 4-hour period. During the initial two hours, 1.22 inches fell with the peak intensity of 0.65 inches per hour occurring between 2 and 3 P.M. EST. This type of storm is perhaps typical of a summer thunderstorm due to its high intensity and short duration. In fact, this storm has established a new record for rainfall on this date. The rainfall previous to the June 16 date occurred on June 10, during which 0.19 inches of rain fell. Trace amounts of rain also fell on June 12, 13, 14, and 15, which totaled approximately 0.01 to 0.02 inches.

An analysis of the total suspended solids, BOD, and oil and grease values for both storms indicates that the nature of the storm, i.e., its intensity and duration, has a large effect upon the pollutants which are bypassed through the regulator. The April 13 storm, which had a relatively long buildup time, allowed the concentration of both parameters (TSS and BOD) to be maximized prior to the peak flow and

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thus some of the "first flush" phenomena was diverted to the treatment plant prior to bypassing. In contrast, the June 16 storm had a high initial rainfall rate, such that the maximum values of pollutant concentrations and flow rates practically coincided. For all practical purposes, all of the "first flush" was discharged into the receiving waters with little or none being diverted to the treatment plant.

In both cases, however, the concentration as well as poundage of pollutants bypassed are very large. For instance, on the April 13 storm, 58,000 pounds of total suspended solids, 19,000 pounds of BOD, and 28,000 pounds of oil and grease were bypassed while on the more intense June 16 storm, over 1 million pounds of suspended solids, 36,000 pounds of BOD, and 180,000 pounds of oil and grease were bypassed. To gain some insight into the magnitude of these values, consider that during the June 16 storm, in 3 hours and 15 minutes of bypassing, approximately 30 times as much suspended solids were bypassed as are discharged from the treatment plant in a full 24-hour normal dry weather flow period. BOD and oil and grease discharges were also very high, especially in light of the fact that the flow through this regulator is only 25% of the total Newtown Creek Treatment Plant flow.

As can be seen from the tables of analytical data, during the wet weather flows, some of the heavy metals appear to have higher concentrations than during dry weather. In particular, wet weather lead and mercury concentrations appear to be significantly higher than corresponding dry weather values. As seen in Tables 15 and 16, dry weather lead concentrations (8 values) are all less than 0.20 Mg/L. Wet weather analyses (see Tables 17 and 19) for lead show concentrations ranging from less than 0.20 to 1.40 Mg/L (16 values). The analyses for mercury during dry and wet weather periods have shown a similar trend. The dry weather analyses for mercury (Table 19) show concentrations below 0.0001 Mg/L (5 values). Wet weather concentrations of mercury (Tables 17 and 19) range from 0.0004 to 0.0074 Mg/L (16 values). It is interesting to note that during the June 16 storm, the total quantities of lead and mercury discharged were approximately 135 and 0.4 pounds, respectively. The increased concentration of these metals during wet weather periods could be attributed to automobile exhaust residues, vehicle drippings, and atmospheric scrubbing of lead and mercury aerosol compounds. However, even those metals which show a lower concentration during storms (due to a dilution effect of the stormwater) still discharge a considerable load into the receiving waters.

Treatment plants in general do not remove the large amounts of heavy metals and thus the effect on the receiving waters should not differ appreciably whether these heavy metals enter directly via bypass flow or indirectly through the treatment plant effluent. It should be noted that even if means were developed to remove these heavy metals at treatment plants (which does not appear to be the general case), this would only allow their removal during dry weather flow. The heavy metals would continue to bypass the treatment plant controls during wet weather flow periods. Thus, it becomes apparent that these heavy metals must be removed at their source before entering the sewer system. Essentially, pretreatment, whether to remove heavy metals or other pollutants, would reduce the load to treatment plants, minimize concentrations in bypass flow, and tend to improve the quality of receiving waters.

If the pollutant values associated with this regulator can be considered representative of the type of bypassing that occurs throughout the District, then some means must be found to minimize the effects of combined sewers, for even though the treatment plants in the District are being expanded and upgraded, this upgrading may not achieve the desired results since the wet weather bypassing may totally overwhelm the receiving waters. In fact, it may be that in determining the efficiency of a treatment system, the results should be evaluated on a systemwide basis; i.e., not only the efficiency of the treatment plant but the net discharge should be considered, including the bypass from combined sewers. Therefore, additional attention needs to be directed toward a total system evaluation of effects, i.e., combined sewers and treatment plants and a minimization of these effects rather than on treatment plants alone.

SECTION XVII

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Daniel Hensel, Senior Planner

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Raphael Vitale, Director
Charles Schmidt, Plant Superintendent
Victor Dauria, Plant Personnel

Housing Authority of the City of Hoboken
M. Edward DeFazio, Executive Director

Jersey City, New Jersey

James Dolan, Chief Engineer - Water and Engineering Division
Robert Sobeck, Plant Superintendent

Allen Cantor, Director - Division of Planning
Nelson S. Silver, Principal Planner - Division of Planning

West New York, New Jersey

Department of Public Works
John Cendo, Commissioner
Frank Oleri, Jr., Plant Superintendent

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New York City Plants, New York

Environmental Protection Administration - Department of Water Resources, Bureau of Water Pollution Control
Martin Lang, Commissioner
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Harman J. Smity, Senior Civil Engineer
Maurice F. Breen, Senior Civil Engineer - Sanitary
Norman M. Cherry, Senior Civil Engineer
Martin J. Gelvand, Senior Civil Engineer
Edward O. Wagner, Acting Chief - Division of Plant Operations
William Fotopulis, Chief - Plant Services Section
William Paulmeno, Assistant Civil Engineer
Ralph Cohn, Assistant Mechanical Engineer
The Newtown Creek Regulator Crew
The Oakwood Beach Regulator Crew

Yonkers, New York

Westchester County Department of Environmental Facilities
William Borghard, Commissioner
Ken Wolf, Chief - Regulator and Pump Station Maintenance
The North Yonkers Regulator Crew

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Clifford A. Haupt - Senior Sanitary Engineer

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SECTION XVIII

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APPENDIX A

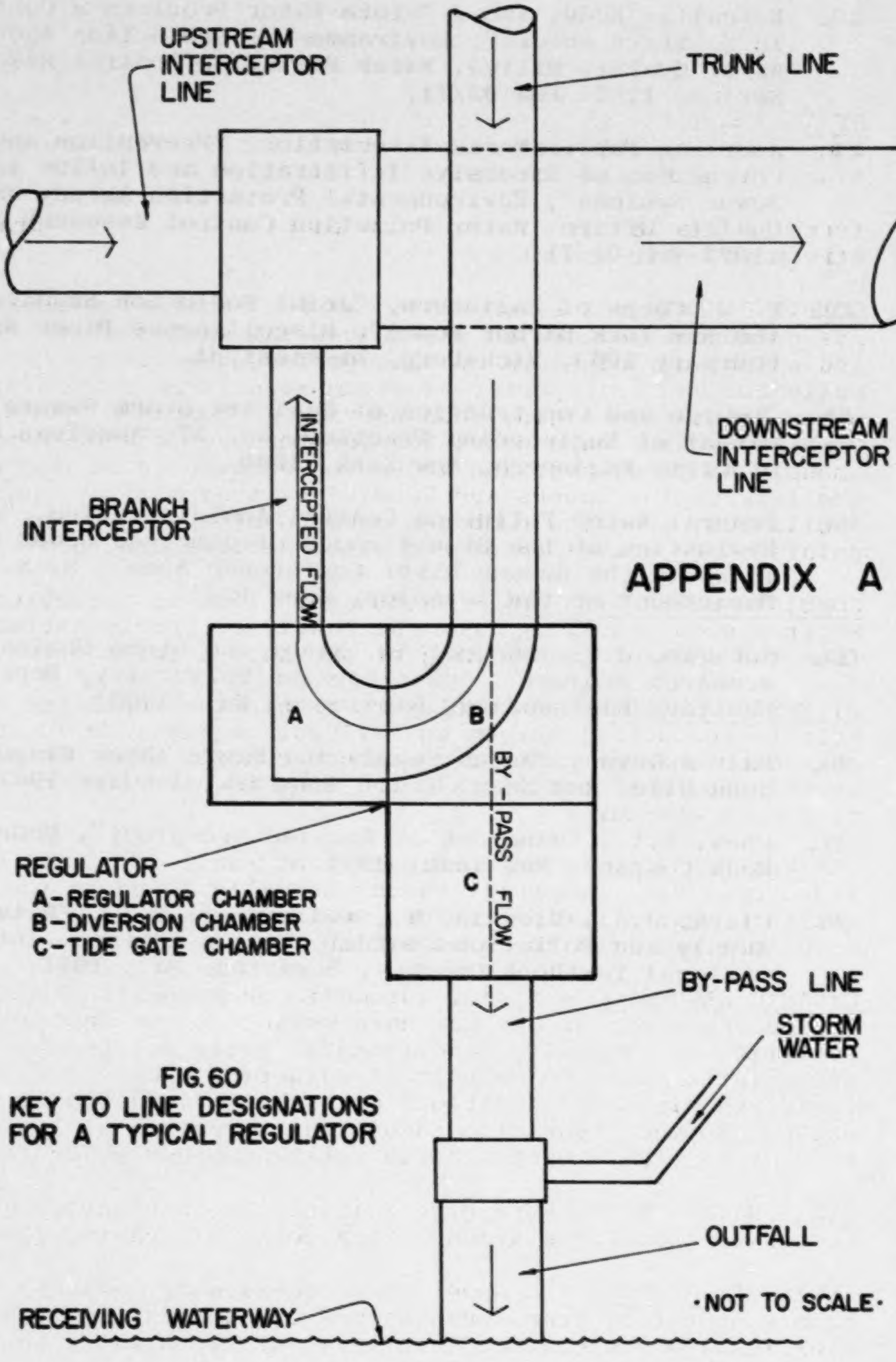
UPSTREAM INTERCEPTOR LINE
TRUNK LINE
DOWNSTREAM INTERCEPTOR LINE
BRANCH INTERCEPTOR
INTERCEPTED FLOW
A
B
BY-PASS FLOW
C
REGULATOR
A-REGULATOR CHAMBER
B-DIVERSION CHAMBER
C-TIDE GATE CHAMBER
BY-PASS LINE
STORM WATER
OUTFALL
RECEIVING WATERWAY
·NOT TO SCALE·

FIG. 60
KEY TO LINE DESIGNATIONS
FOR A TYPICAL REGULATOR

APPENDIX B

GLOSSARY AND ABBREVIATIONS

BYPASS (noun) - An arrangement of pipe, conduit, gates, pumps, and valves whereby the flow may be passed around a hydraulic structure or treatment facility.

(verb) - The act of causing flow to pass around a hydraulic structure or treatment facility.

COMBINED SEWER - A sewer which carries sanitary sewage with its component commercial and industrial wastes at all times and which, during storm or thaw periods, serves as the collector and transporter of storm water from streets or other points of origin, thus serving a "combined" purpose. Combined sewers make provision for the overflow of excessive amounts of flow, over and above the volumes to be carried by the interceptor sewers and handled by treatment or pumping facilities, from the combined sewer system at predetermined points where some form of regulator devices are located.

COMBINED SEWER OVERFLOW - Wastewater flow in a combined sewer system resulting from the runoff of precipitation or from the flowing or draining of previous precipitation.

DIVERSION CHAMBER - An enclosure within the regulator which acts to conduct flow from an influent sewage line to the regulator chamber under dry weather conditions. During wet weather (bypass conditions), the flow is directed to the tide gate chamber.

DRY WEATHER FLOW - The combination of sanitary sewage and industrial and commercial wastes normally found in the sanitary sewers during the dry weather season of the year, sometimes referred to as base flow.

DYNAMIC REGULATOR - A semi-automatic or automatic regulator device which may or may not have movable parts that are sensitive to hydraulic conditions at their points of installation and are capable of adjusting themselves to variations in such conditions or of being adjusted by remote control to meet hydraulic conditions at points of installation or at other points in the total combined sewer system.

FORCE MAIN - A pressure pipe joining the pump outlet at a wastewater pumping station with a point of gravity flow.

INTERCEPTOR SEWER - A sewer that receives dry weather flow from a number of transverse sewers or outlets, and frequently additional predetermined quantities of storm water admixed with sanitary flows, and conducts such wastewaters to a point for treatment or for disposal between the collector sewer and the interceptor sewer.

LOADING - The dry weight, in pounds, of some material that is being added to a process or disposed of to a receiving waterway.

Mg/L - Milligrams per liter or the concentration of some chemical in a liquid. If a letter appears after "Mg" it represents the chemical symbol, e.g., "N" for nitrogen, "p" for phosphorous.

MGD - Million gallons per day -- a common term for quantity of wastewater flow.

OUTFALL SEWER - The outlet, structure, or sewer through which sewage is finally discharged.

OVERFLOWS - The overflowing of trunk or interceptor sewers resulting from the combination of extraneous flows and normal flows that exceed their capacities.

RATIONAL METHOD - A means of computing storm drainage flow rates by use of the formula Q=CIA where Q is the peak runoff, C is a coefficient describing the physical drainage area, I is the rainfall intensity, and A is the drainage area.

REGULATOR - A structure which controls the amount of sewage entering an interceptor by storing in a trunk line or diverting some portion of the flow to an outfall.

REGULATOR CHAMBER - An enclosure which acts to control the quantity of flow of sewage admitted to an intercepting sewer or a unit of a sewage treatment plant.

STATIC REGULATOR - A regulator device which has no moving parts or has movable parts which are insensitive to hydraulic conditions at the point of installation and which are not capable of adjusting themselves to meet varying flow or level conditions in the regulator-overflow structure.

TIDE GATE CHAMBER - An enclosure within the regulator which acts to conduct the sewage flow (usually bypass) through a tide gate to the outfall.

TRUNK - A large sewer which receives wastewater from tributary branch sewers serving generally one drainage area.

ABBREVIATIONS

BR	Branch
CA	Corrugated Aluminum
CB	Circular Brick
CFS	Cubic Feet per Second
CI	Cast Iron
CIRC	Circular
COM	Commercial
CONC	Concrete
FTRC	Flat Top Reinforced Concrete
IND	Industrial
INT	Interceptor
MDWF	Mean Dry Weather Flow
N/A	Not Available
OB	Oval Brick
OTH	Other
PRCP	Pre-cast reinforced concrete pipe
RC	Reinforced concrete
RES	Residential
VP	Vitrified (Clay) pipe
Ø	Diameter

APPENDIX C

LEGEND FOR DRAINAGE BASIN AND REGULATOR LOCATION MAPS

------	LEAD LINE TO REGULATOR'S DRAINAGE AREA
────	LIMITS OF DRAINAGE AREA
━━━━	OUTFALL
━━━━	INTERCEPTOR
REG.	REGULATOR CHAMBER
DIV.	DIVERSION CHAMBER
T.G.	TIDE GATE CHAMBER
◯→	REGULATOR NUMBER
●	EXISTING REGULATOR
○	PROPOSED OR UNDER CONSTRUCTION REGULATOR
▲	EXISTING PUMP STATION
△	PROPOSED OR UNDER CONSTRUCTION PUMP STATION
■	EXISTING SEWAGE TREATMENT PLANT
□	PROPOSED OR UNDER CONSTRUCTION SEWAGE TREATMENT PLANT

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APPENDIX D

TERMS USED IN TABLES 18 and 20

Sample Number - Consecutively numbered grab samples taken from overflow during storm.

Time (EST) - Eastern Standard Time used in all cases.

Interval (Min.) - Time interval between grab samples.

Avg. Dry Weather Flow (CFS) - Based on limited field observations made during dry weather sampling.

Total Flow (CFS) - Sum of Avg. Dry Weather Flow and Runoff.

Bypass (CFS) - Difference between Total Flow and Regulator's Capacity.

Bypass (MGD) - Conversion Factor: 0.649 x (CFS) = (MGD).

Avg. Bypass During Interval (MGD) - $\overline{\text{Flow}}$ (MGD).

TSS (Mg/L) - Values from laboratory analyses of wet weather samples.

Avg. TSS During Interval (Mg/L) - $\overline{\text{Conc.}}$ (Mg/L).

TSS (Lbs) - $\overline{\text{Conc.}}$ (Mg/L) x 8.34 Lbs/Gal x $\overline{\text{Flow}}$ (MGD) x Interval (Min./24 x 60).

BOD (Mg/L) - Values from laboratory analyses of wet weather samples.

Avg. BOD During Interval (Mg/L) - $\overline{\text{Conc.}}$ (Mg/L).

BOD (Lbs) - $\overline{\text{Conc.}}$ (Mg/L) x 8.34 Lbs/Gal x $\overline{\text{Flow}}$ (MGD) x Interval (Min./24 x 60).

Oil and Grease (Mg/L) - Values from laboratory analyses of wet weather samples.

Avg. Oil and Grease During Interval (Mg/L) - $\overline{\text{Conc.}}$ (Mg/L).

Oil and Grease (Lbs) - $\overline{\text{Conc.}}$ (Mg/L) x 8.34 Lbs/Gal x $\overline{\text{Flow}}$ (MGD) x Interval (Min./24 x 60).

$\overline{\text{XXX}}$ - Average value of parameter.

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